THE ATOM

Los Alamos Scientific Laboratory

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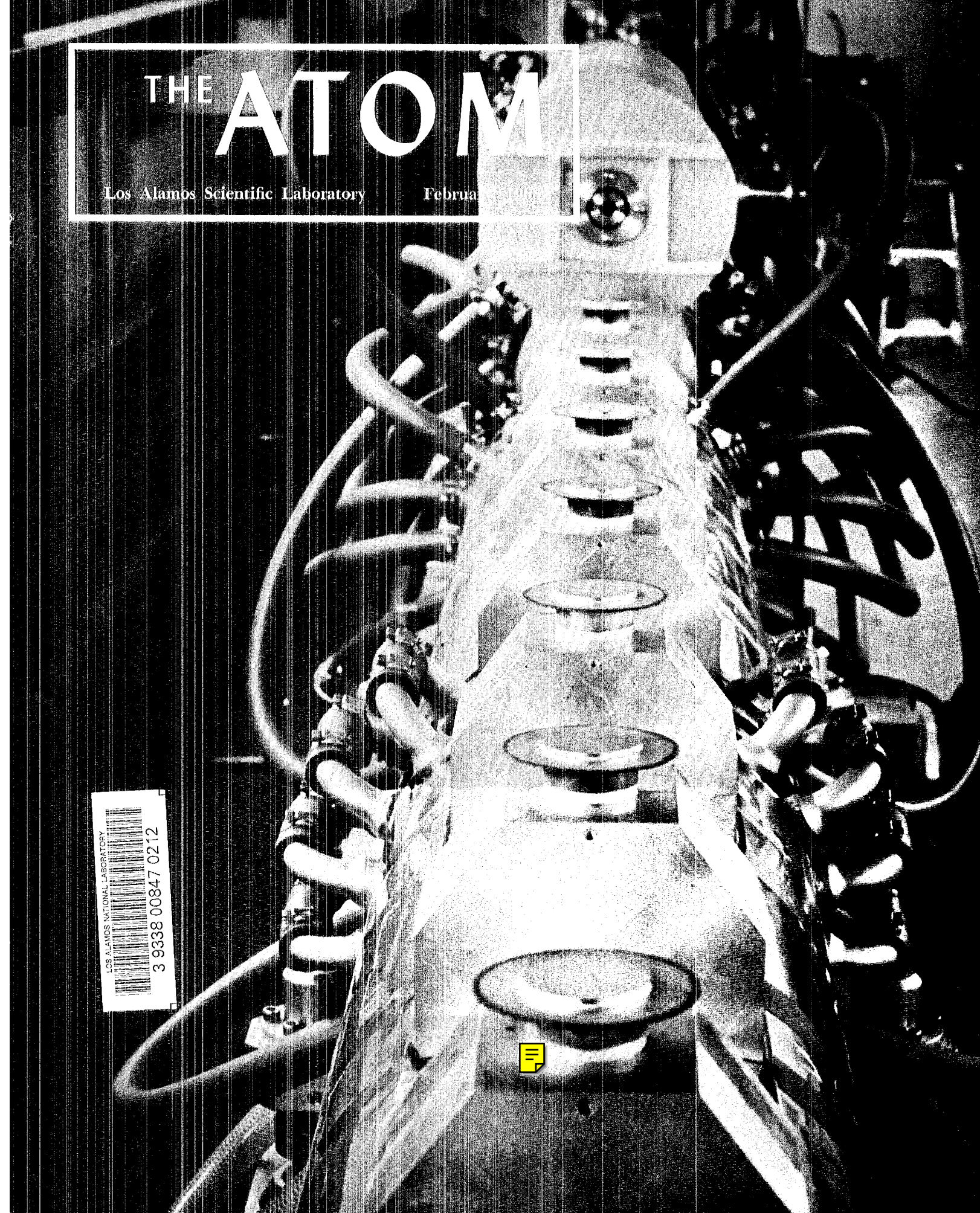

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THE ATOM

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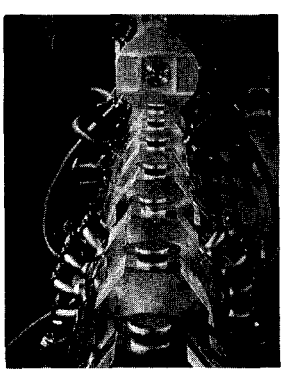
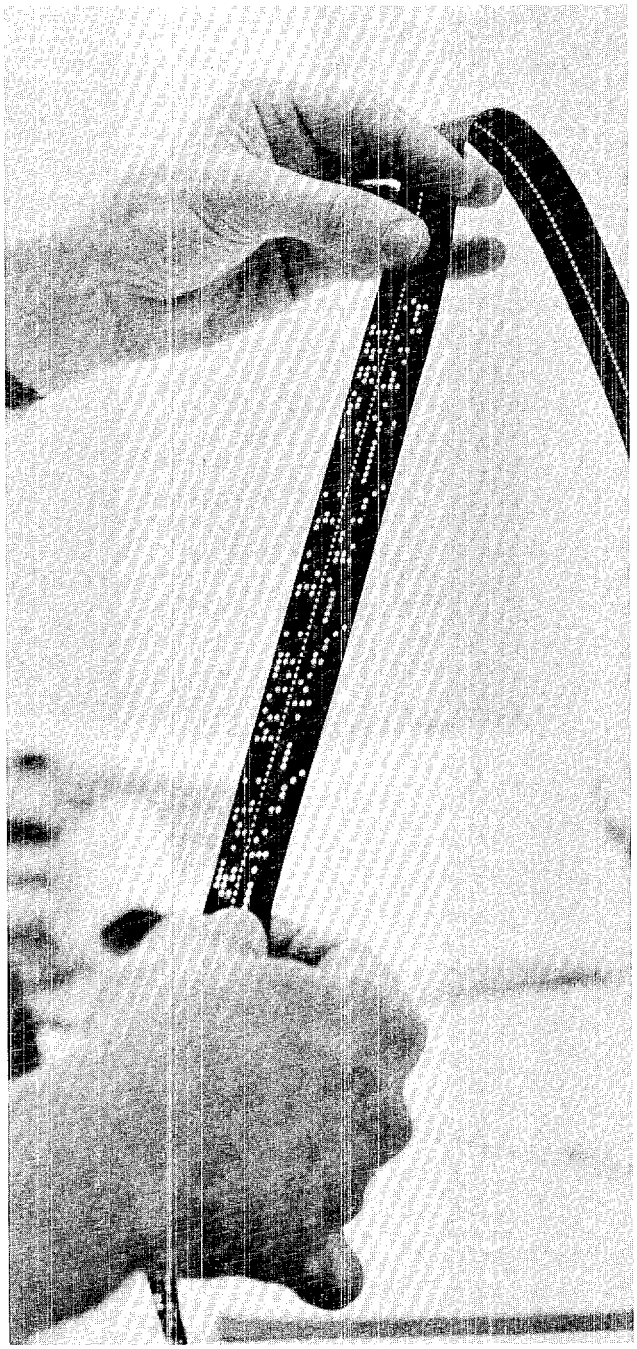


COVER:

Prototype electron linear accelerator will aid MP division scientists in preliminary studies related to the Los Alamos Meson Physics Facility, scheduled to be in operation by late 1971. Photo by Bill Jack Rodgers. Story begins on page 16.



The perforated tape used in the NC process can be "read" by the controller unit to perform a programmed instruction. It can also be read by a programmer once he figures the code.

NC Machines Handle Jobs Once 'Impossible'

By Bill Richmond

Machining jobs that were "impossible" a few years ago are now considered routine by the Shops Department, thanks to a process known as numerical control (NC) machining.

NC machining incorporates a programmer, a computer and a machinist to provide a superior product at less cost.

A numerically controlled machine is capable of positioning its tool in accordance with prerecorded commands. Normally these commands are recorded on perforated tape, although some systems can use punched computer cards.

(A rough parallel can be drawn between NC machining and the old player pianos. These pianos receive their instructions via holes punched in a tape. The NC machines in the Shops Department

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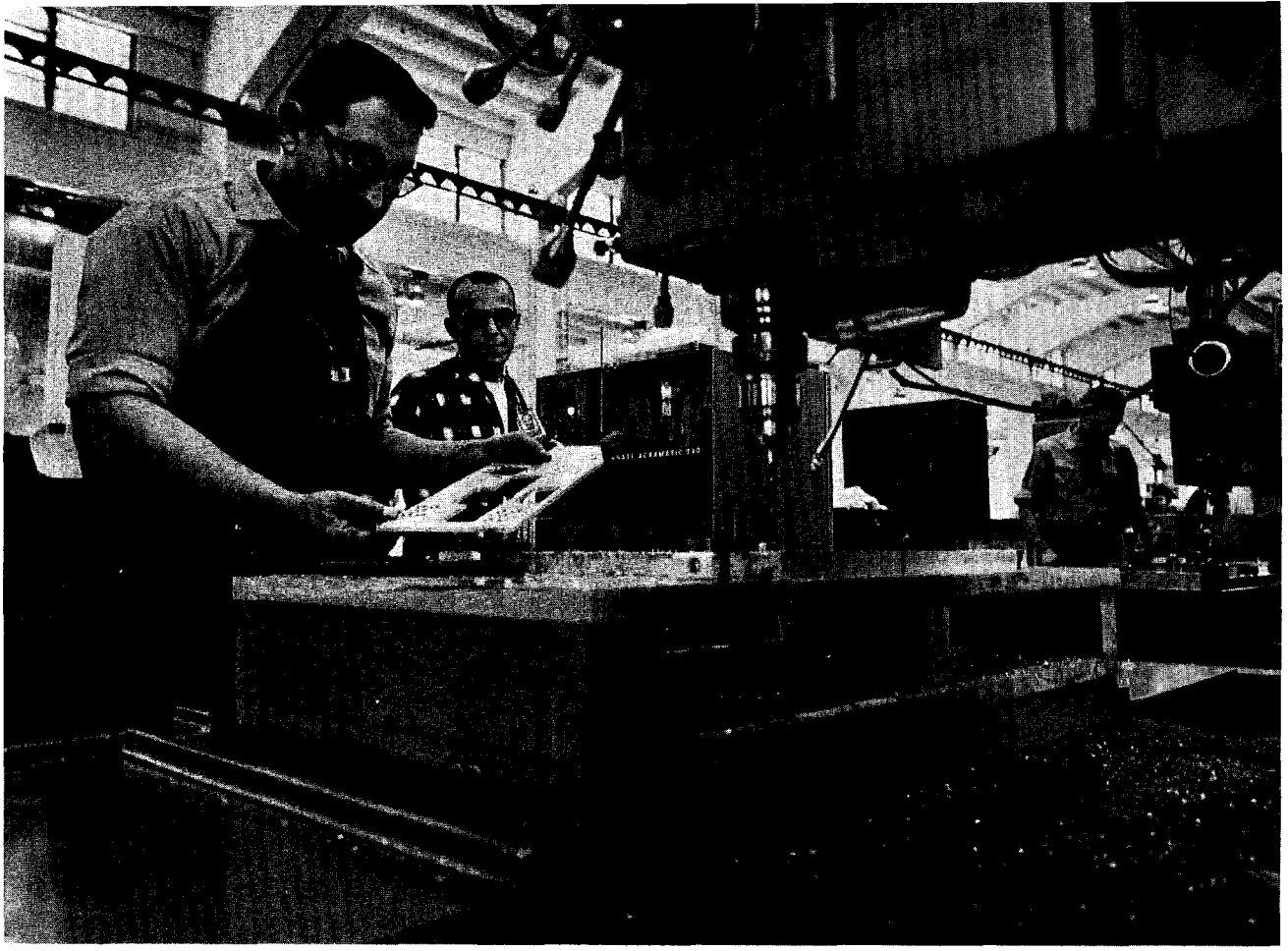

Benito Montoya, foreground, and Jack Dyson, both SD-1, prepare to machine a part with an NC machine. Montoya places the part on the table while Dyson stands near the controller with his hand on the tape reel.

NC Machining . . .

continued from preceding page

are considerably more complicated than a player piano, but they are controlled by essentially the same principle.)

A "controller unit" hooked into the NC machine contains a tape reader and the electronic logic required to change the hole pattern in the tape into electrical signals that cause movements of the cutting tool. If the punched tape controls the successive positions of the tool, the control unit is classified as a point-to-point or positioning control. If the tape controls not only the positioning of the tool but controls the tool path at all times during movement, the NC system is classified as a continuous path or contouring system.

Gordon Anderson, senior programmer for SD-6 (research and development group), explains the difference in the two systems this way: "In point-to-point, the machine doesn't care how it gets from one point to another as long as the necessary operations are performed at the various points. In continuous path, or contouring, there is a predetermined path between points, and this path is necessary for the particular operation."

The LASL Shops Department presently has six NC machines with a seventh—a lathe—on order and

expected to arrive in September. The machines now in operation include one drilling machine, two vertical milling machines, one turret drill, one jig borer and a new three-axis precision milling contouring machine. The latter is the only three-axis contourer in Shops; the others are point-to-point machines capable of performing a limited amount of two-axis contouring.

The first NC machine was built in the mid-1950's. Frank Stack, Shops Department head, foresaw the potential applications of the NC process, and SD received its first machine in July, 1963. The first LASL Shops Department model cost about $12,000 as compared to the latest machine which has an estimated cost of $235,000.

"We started off with simple machines and then built up to more sophisticated ones," said Al Zerwas, assistant department head and SD-6 group leader. "And our plans are to increase our NC facilities in the future."

"Roughly 10 to 15 per cent of the machining work we do is by numerical control, and we could do more if we had the machines," Zerwas added.

How is a typical NC job handled?

The coordinator for the numerical control machines, Ed Gritsko, looks at each job order that comes into the Shops Department. He decides if the job can be applied to NC machining and, if so, discusses job requirements with Anderson and the shops foremen. Then one of the three programmers in SD-6 —Anderson, Ralph Gladfelter or Lloyd Hewitt—writes the program in symbolic language that describes the machining steps. (All three programmers are men experienced in shop practices. "The programmers must have practical experience and know how to machine before they are capable of drawing up instructions," Zerwas said.)

Information contained in the program includes the x and y co-

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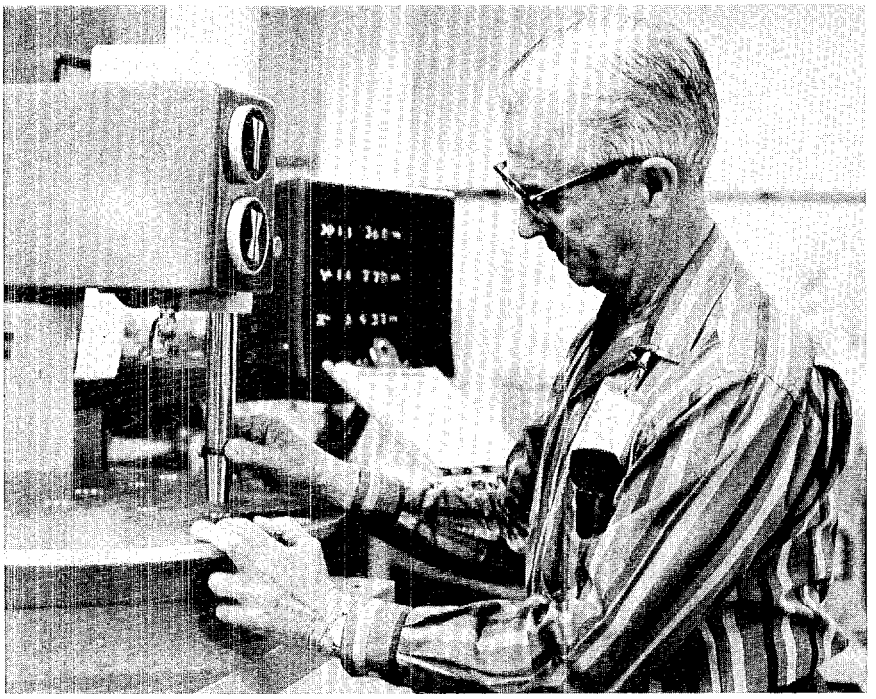
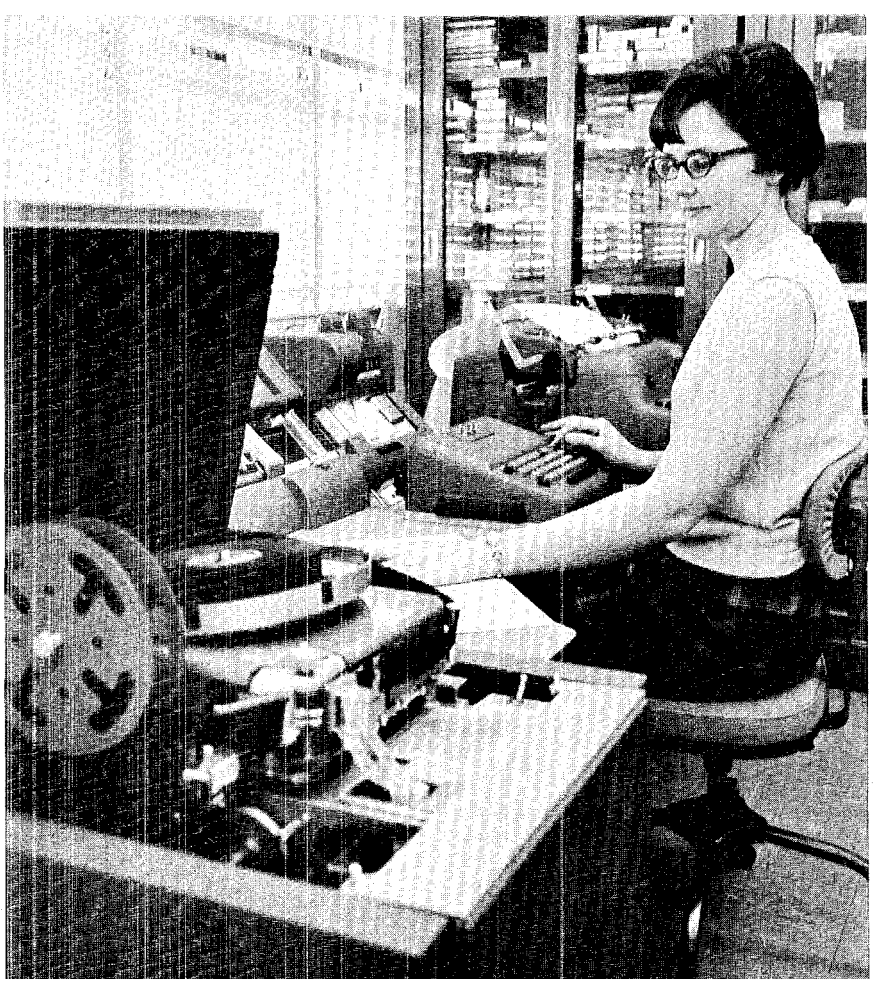
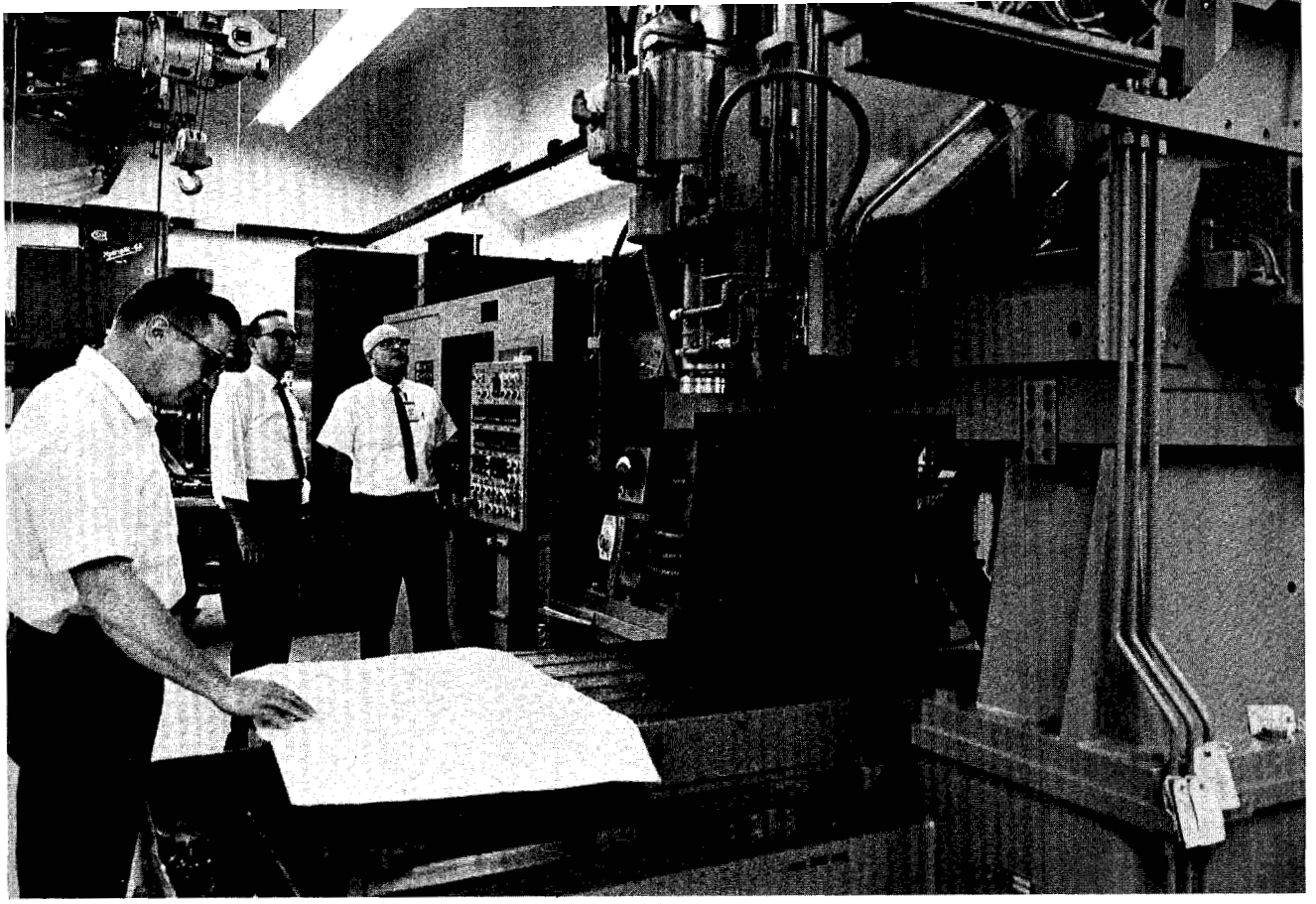


Larry DuFrane, SD-4, handles machine to inspect parts turned out in Shops.

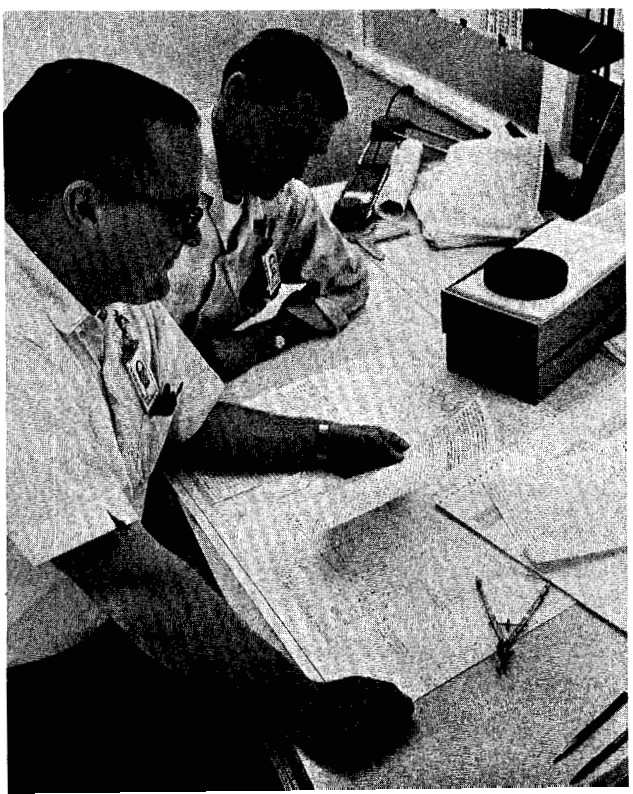
Sharon Schilling prepares the computer cards from a program written by one of three programmers in SD-6. Cards then "tell" the machines what to do.





Gordon Anderson, senior programmer for SD-6, studies a drawing while Ed Zerwas and Ed Galvin inspect the new $235,000 three-axis contourer recently received by SD.

Ralph Gladfelter, left, and Lloyd Hewitt, SD-6, look over specifications before writing a program to fit the job.



NC Machining . . .

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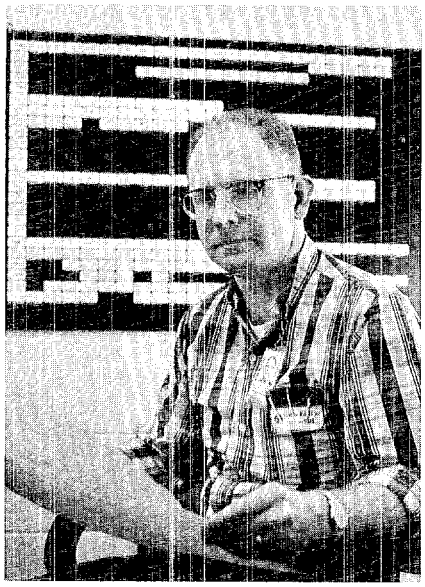
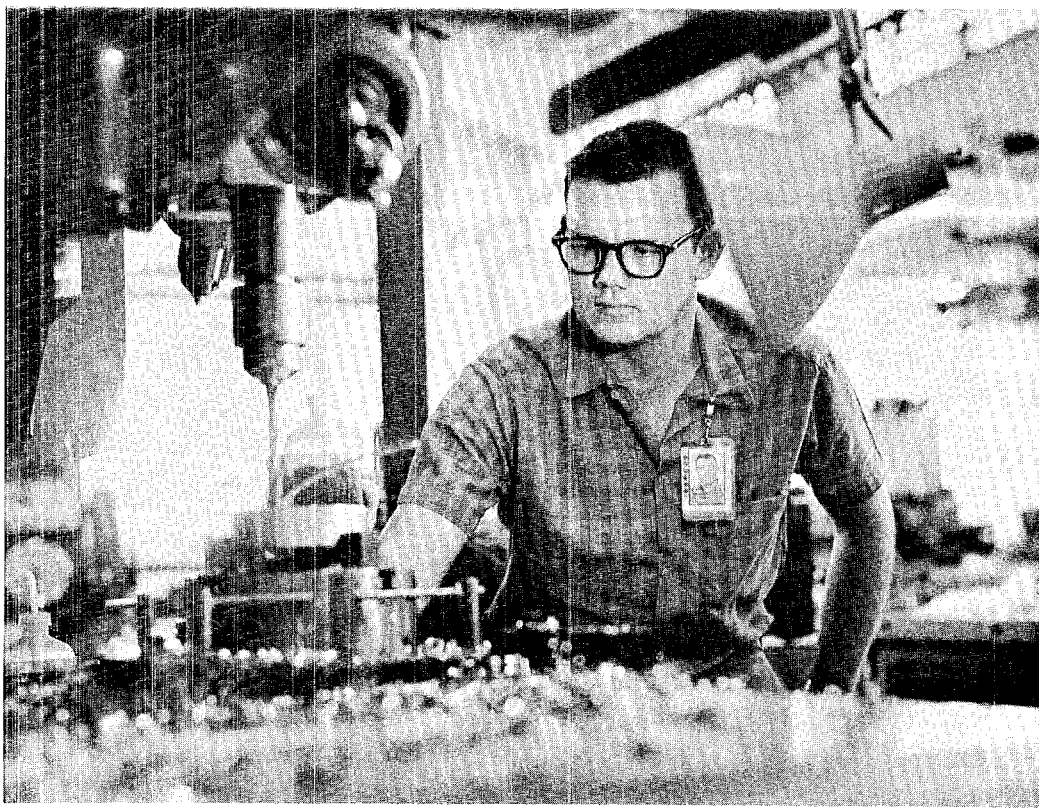
ordinates for point-to-point machining and the commands for continuous path or contouring. This information also includes preparatory and miscellaneous function commands, movements of the rotary table, depth of cut, spindle command, tool number, speed of spindle movement, etc.

This program is taken to the key-punch section in the main shops building, and the statements in the program are transcribed into tape for the relatively simple jobs, or punched cards for the more complicated projects.





ABOVE: Ed Gritsko, NC coordinator, looks at each job that comes into the Shops department to see if it can be handled by the NC process. RIGHT: Leland Zollars, 5D-1, keeps his eye on a numerically controlled turret drill.

The information on the cards is then fed into computers in T Division which calculate the coordinate points through which the cutting tool must pass to machine the part, produce a perforated tape and provide a graphic plot that can be compared to the original drawing.

The perforated tape is received back in the Shops Department, checked for proper programming or obvious errors and then sent to the scheduled shop by Gritsko.

At the machine, the tape is fed into a controller which is hooked up to the machine. The controller "reads" the holes in the tape and sends out electrical pulses to the machine tool. The tape thus guides the machine in performing the necessary operations required to produce the part. The machine has a "feedback" to insure the programmed instructions are followed. There is also a manual override on the NC machines whereby the machinist can disengage the tape if he desires, or control it manually instead of using tape.

What are the advantages of NC machining?

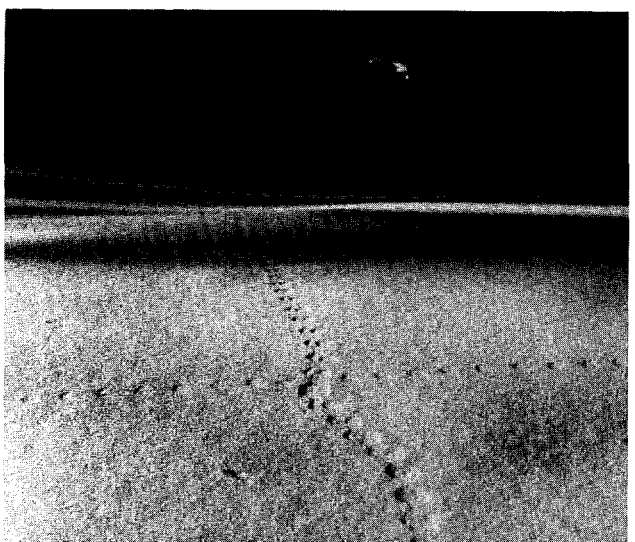
"To begin with, we significantly reduce the labor costs on jobs utilizing numerical control machining," Zerwas said. "Also, it is more flexible in making changes, eliminates the fatigue factor of the machinists—and each part of a repetitive job is the identical twin of all others, with no variation." Thus, only a spot check inspection of the parts is required. On jobs that are done manually, a more extensive inspection is required.

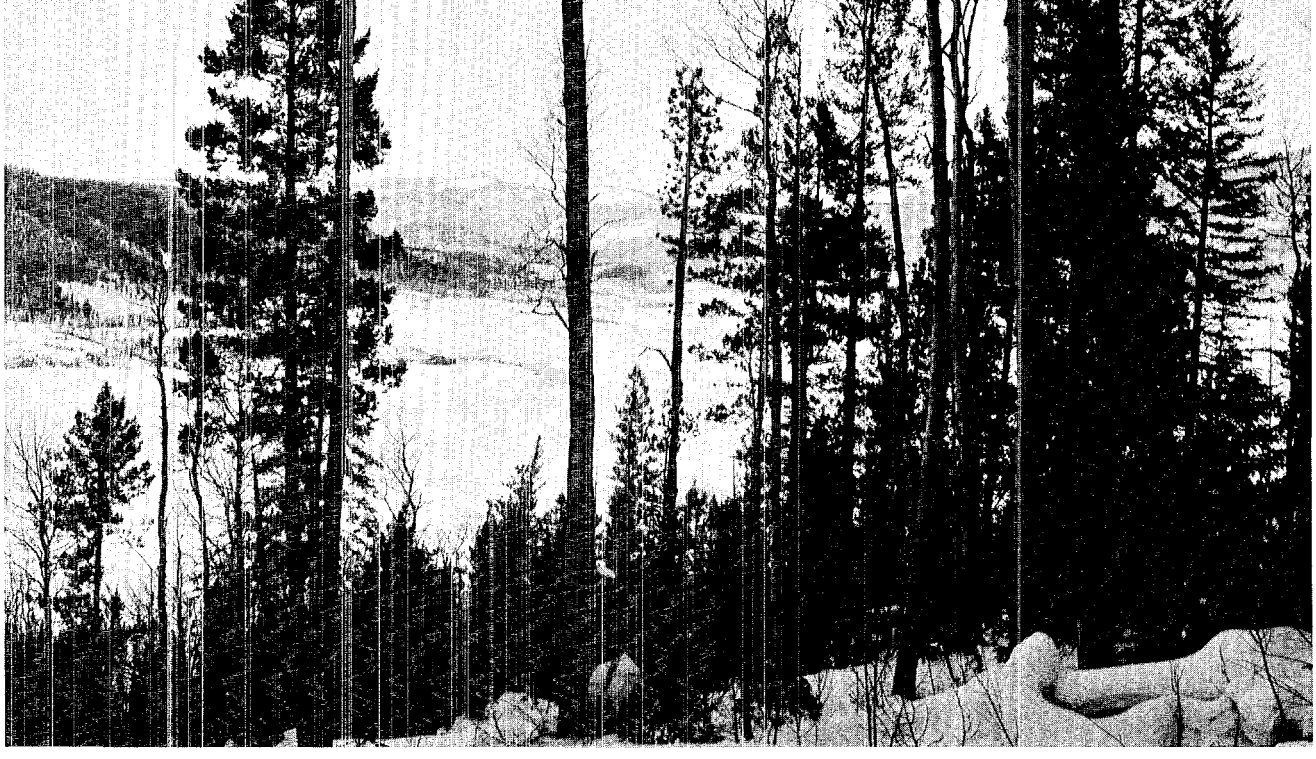
"Jobs that we would never have attempted before due to the complexity of calculating the thousands of x and y coordinates or calling for an extremely close tolerance can now be done by NC machining," Anderson noted. It is economically feasible to call for closer tolerances with numerical control. It can easily take 20 times longer to produce a complex part to a 0.0005 tolerance manually than by numerical control, according to one large computer manufacturer.

Record-breaking snowfall in Los Alamos this winter meant many things: quiet beauty and buried cars and tracks of many creatures.

A Study In White

Photographs by Bill Jack Rodgers





TOP: The Valle Grande. RIGHT: Rolf Peterson, K-DO, found motorized skiing the best way to see the scenery. BELOW: Snow fell almost steadily for more than a week—at times more than an inch an hour. December total was a record 41.3 inches—most of it the last two weeks of the month.

Higher Costs Force Premium Increases On Health Insurance

SPIRALING MEDICAL COSTS and unusually high utilization of medical facilities by LASL employes have made it necessary to increase premiums on all group health insurance plans.

On Jan. 1, premiums of the three plans, two of which are underwritten by Equitable Life Assurance Society and available to all University of California employes, and one by New Mexico Blue Cross/Blue Shield, available to LASL employes only, were hiked by amounts ranging up to $7.50 per month.

Kenneth J. Wilson, head of LASL's Employe Benefits group, says the increases were the direct result of higher medical costs and the heavy Los Alamos claims experience during 1966 and 1967. Benefits paid to LASL employes by Equitable health plans alone amounted to over $1 million in 1967. One plan, Equitable's "Basic plus Major Medical," recorded a claims deficit of $132,000 during the last calendar year, a loss which was by far the worst in any university installation.

Although the reasons for such a poor showing are not easily ascertained, Wilson speculates that a prime cause of the large number of claims may simply be the ready availability of good hospital care. The Los Alamos Medical Center, unlike most hospitals, is rarely full to capacity and may be utilized for some illnesses and procedures which would likely be treated on out-patient bases in other cities. "We are fortunate to have this service here, but there is a high price tag on it," he noted. "In addition, national studies have indicated that communities with above-average incomes and those with more education are more apt to use the medical facilities in their communities. Los Alamos qualifies on both counts."

LASL employes may choose from among three insurance plans:

Equitable "Basic and Major Medical," also known as "Plan II," provides essentially full coverage of costs incident to hospitalization. After exhausting the generous scheduled benefits, a major medical plan provides reimbursement for 80 per cent of additional medical costs up to a maximum of $15,000 per cause.

Blue Cross/Blue Shield is a basic plan providing essentially full coverage for the costs of hospitalization and physicians' charges when provided in a member hospital and by participating physicians.

Equitable "Plan III," or "Comprehensive Health Care," is a major medical insurance plan in which the insured pays the first $100 of medical expenses and then is reimbursed for 80 per cent of the covered charges beyond the deductible amount up to a maximum of $20,000 per cause. Since this "co-insurance" concept is designed to protect against the catastrophic illness but not recover full costs, the premium is cheaper than those of the other two plans.

Before the open enrollment, Equitable and the University of California's Department of Insurance and Retirement Systems announced a premium increase of about 25 per cent and the introduction of a $50 deductible restriction for LASL Plan II members. The result was a mass migration of 709 LASL employes switching from Plan II to the less costly Plan III.

Strangely enough, LASL members of New Mexico Blue Cross/Blue Shield appeared not ready either to fight or switch, despite similar premium raises. After the open enrollment period, only a small fraction of the 300 employes had changed their allegiance.

Neither Wilson, who represents the Laboratory in insurance negotiations, nor Assistant Group Leader Neva Roberson, long-time insurance counselor to Lab employes, is happy over the steep price increases. "It was clear that something had to be done; the trend toward higher medical costs is not going to be reversed. We're hoping that the present situation can be controlled. If we have a similar experience in 1968, we're going to have some more tough insurance negotiations," Wilson concluded.

Los Alamos Civil Defense shelter managers got some practical training during an eight-hour stay in one of the fallout shelters. The exercise was part of a course conducted in Los Alamos by the University of New Mexico.

Preparedness: Los Alamos Ranks High

By Bob Brashear

REALITY—THE ONE INGREDIENT nobody wants added to a Civil Defense emergency—is about the only thing lacking at Los Alamos now that the shelter managers have completed their second management training course.

Evaluation forms submitted by shelter staff members after their 16-hour management seminar in December indicate they feel their training on theoretical and basic operations is pretty well complete.

The shelter managers' Troika staged the training seminar in cooperation with the University of New Mexico Extension Division. The course was designed and presented by UNM with John Benton, Albuquerque, as the instructor. Benton said he issued 70 certificates for completion of the 16-hour course which

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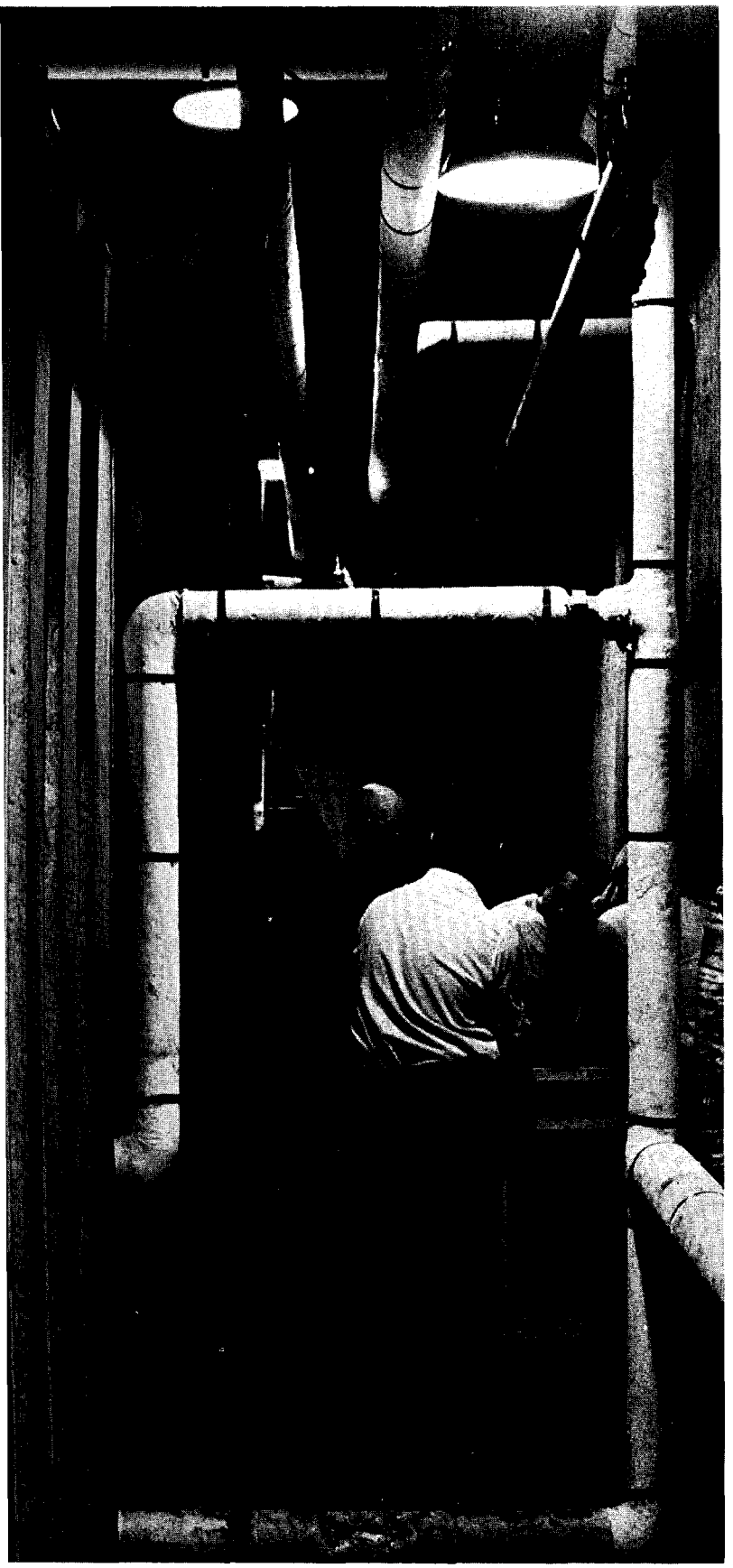

Although simulated emergencies were presented—and handled with dispatch —the reality and anxieties of a real emergency were, fortunately, missing, and participants found bull sessions helped pass the time. The shelter used for the exercise is in the sub-basement of the Health Research Laboratory.

Shelter Exercise . . .

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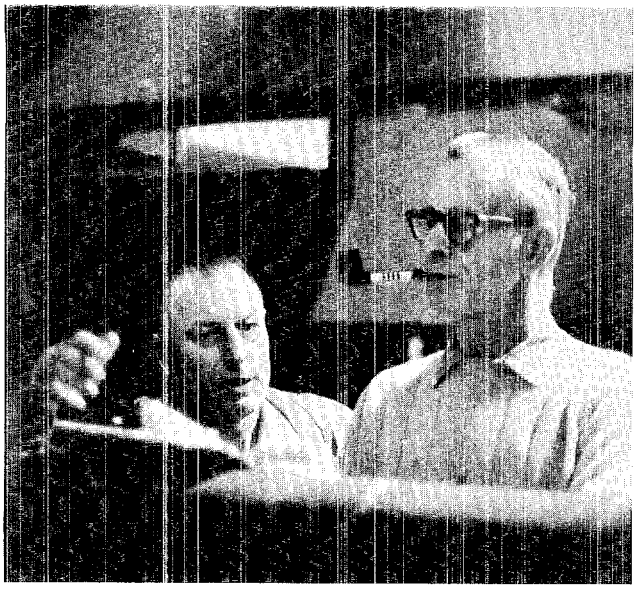
included an eight-hour exercise in a fallout shelter. He said 81 staff members attended the lectures, but only 70 were able to attend classes and to participate in the shelter stay.

Following the lectures, the group moved into Shelter 43-001 in the basement of the Health Research Laboratory. Wright Langham, H-4, acted as shelter manager. With the aid of the CD communications group, Benton beamed in radio reports of simulated outside conditions from the Central Control station in Security Guard Headquarters. Reports on outside radioactivity, attempts to locate missing relatives, power and water supply problems were also a part of the radio communications plans. The eight-hour shelter stay started at 3 p.m.

As a special project, 19 members of Cadette Girl Scout Troop 62 took part in the shelter exercise. The girls were supervised by their leader, Mrs. Don Cromer, who was aided by Miss Marilyn Clark.



The "bunking crew" for the shelter exercise included Frank Hauser, left, and Art Robison, both GMX-3. This crew is responsible for assigning sleeping areas—especially important if the shelter is crowded.

Members of Cadette Girl Scout Troop 62 participated in the shelter exercise, along with shelter managers. Since they came in later than other participants, they were checked for radiation as they entered the shelter, as would be done in a real emergency.

Shelter supplies and materials furnished by Benton were used for feeding and training, and occupants were given specific assignments on first aid, monitoring, sleeping, communications and inventory teams.

Langham, head of the Troika, said staffs of nearly all the 46 Los Alamos fallout shelters were represented.

Benton, in introducing the course, reminded shelter managers there are other "emergencies" besides the nuclear warfare type. Civil Defense disaster units have been of great help during hurricanes of recent years and in Alaska when the major earthquake occurred, he said. Considerable knowledge on the problems of logistics and reactions of people to shelter life and the stresses of emergency situations was gained as a result.

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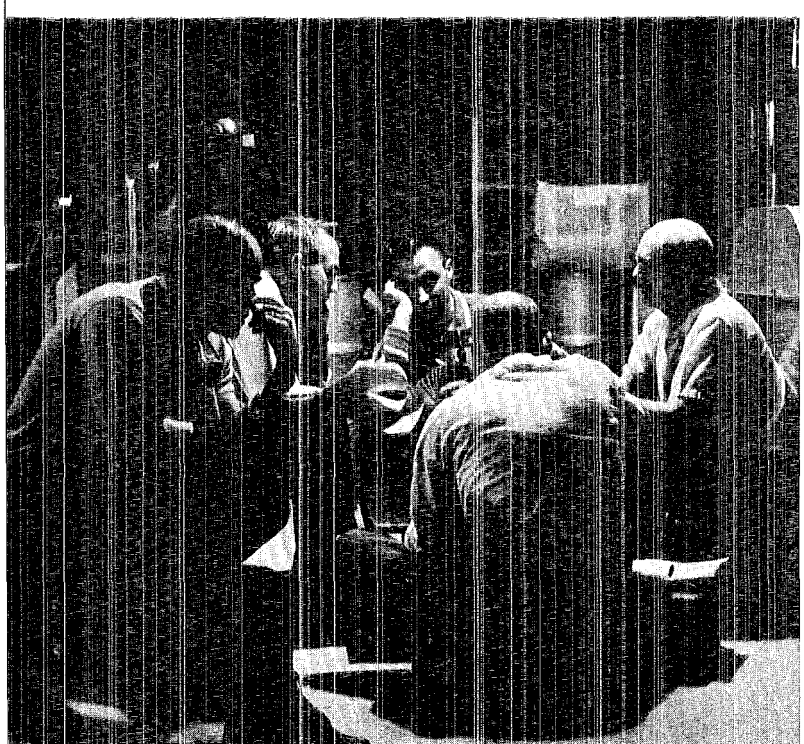
Although the Girl Scouts took the exercise seriously and proved to be a great help during the shelter operation, their assigned corner at times resembled a teenage slumber party.

Reports of outside radiation conditions were given hourly during the exercise, as would be done during an emergency, and a group listens to a conversation between Bob Stapleton, GMX-11, and the radio communications center.

Cards broke the monotony for some. Clockwise, from left: Mohammed Alei, CMF-2; Ed Brown, N-4; Steve Stoddard, CMB-6; Adam Schuch and Bob Mills, CMF-9. Card games are fine, but gambling is prohibited in shelters.



Shelter Exercise . . .

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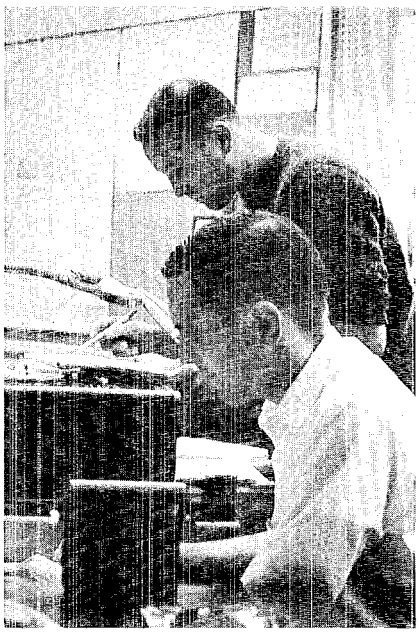
Benton congratulated the volunteers who work in the Civil Defense organization of Los Alamos and praised the city's residents as a whole for their continued support of an emergency preparedness program. "It is difficult to educate people to the need for an emergency preparedness program," Benton said. "But a strong national defense and natural emergency program starts at the level of the city and the state. Los Alamos is an example of what a strong Civil Defense program can be."

Los Alamos shelter managers organization ran its own training course in 1963 and also conducted a series of radiation monitoring classes. Benton said his seminar was oriented more toward occupying the shelter, getting shelter routines organized and coping with behaviour problems of people suffering from various types of anxiety. The university has radiation monitoring instruction courses, but they are given at

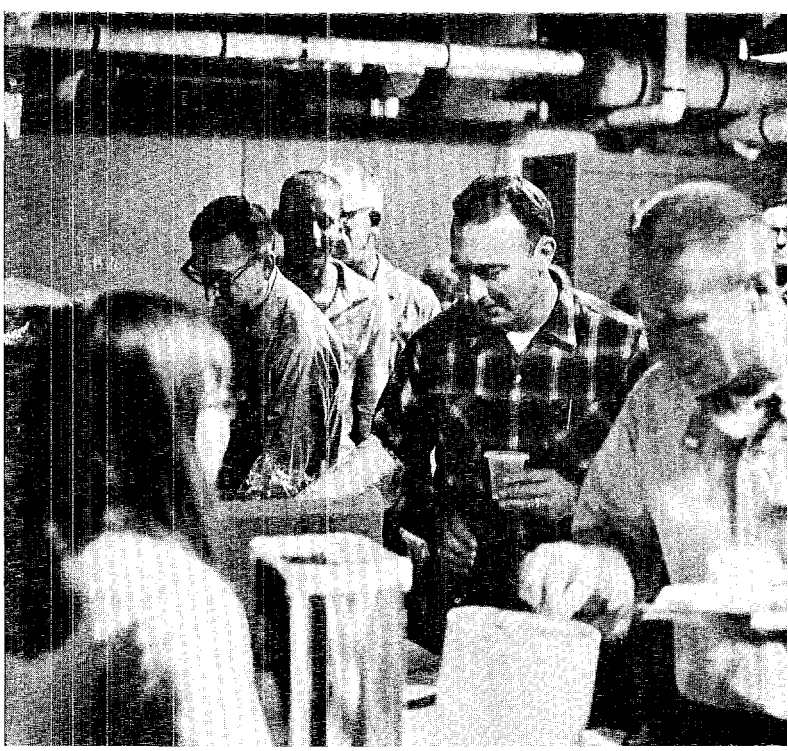
Peter Salgado, K-4, at rear, and Wendell R. Williams, GMX-3, calibrate instruments to make a radiation check inside the shelter.



Murray Cantwell, T-12, foreground, helps man radios at Station 100 as John Benton, UNM, prepares another problem situation for shelter occupants.

Henry Fullbright, left, and Dana Elliott, both GMX-1, had the forethought to bring their own reading material—an item not stocked in the shelters.

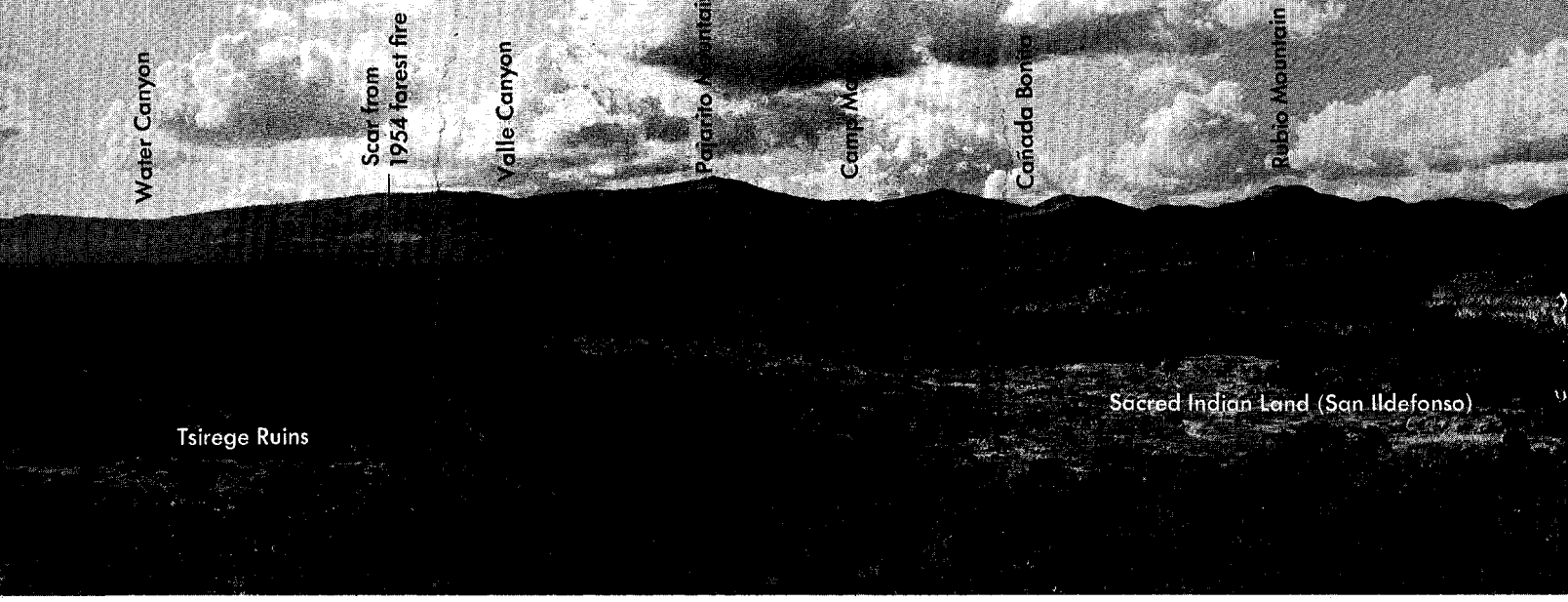
It may not be filet mignon, but the standard shelter fare of survival crackers, fortified candy and water managed to bring some smiles after a few hours in the shelter.



a different time, he said. The course given at Los Alamos was slanted toward inventory of supplies, immediate care of sick and injured and assignment of duties.

Problems to overcome center around the fact that Americans are sharply aware of their "rights", accustomed to freedom, accustomed to having most of their wants satisfied, widely divergent in skills and initiative and supremely self-confident, Benton said. The manager must work to create in his group of suddenly confined shelterees the concepts of oneness, interdependence, common goals and purposes and subordination of individual to group needs. He called it "converting the 'me' to the 'we' concept, first for survival, and then for post-attack recovery."

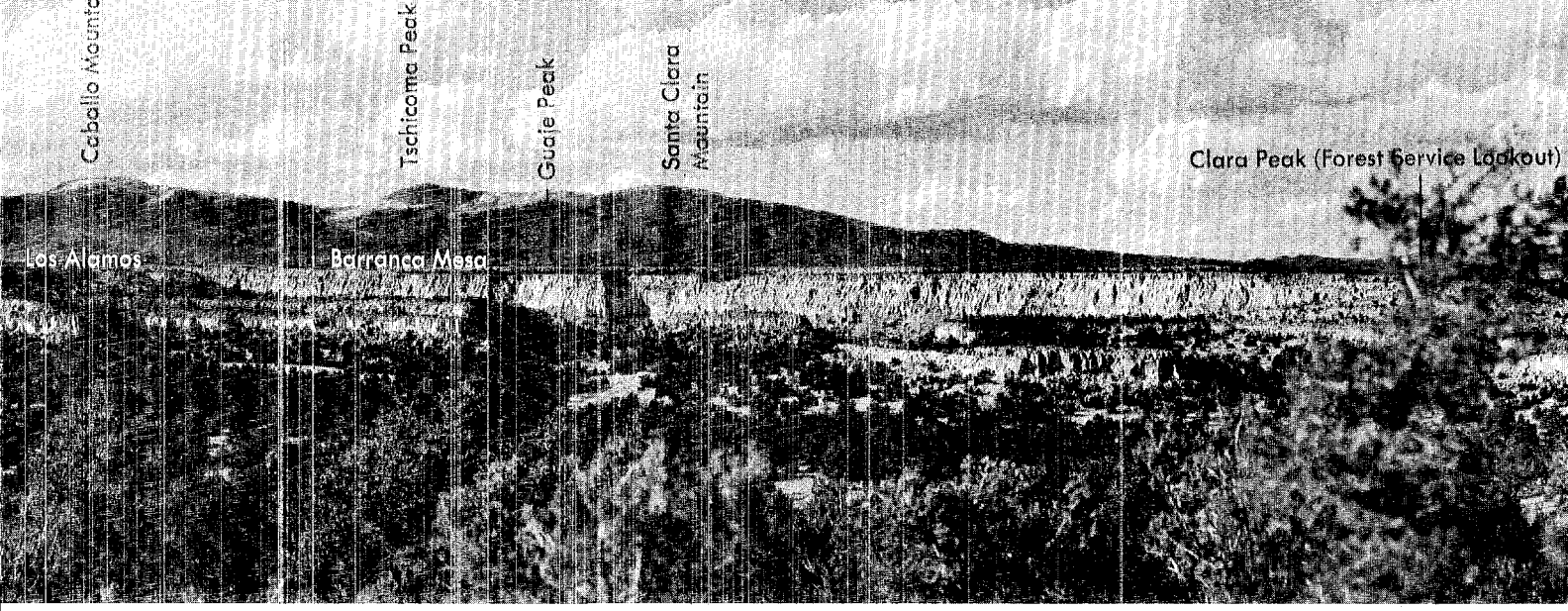
Opinion forms indicated that all the managers were acutely aware that the one ingredient lacking was reality, but they were ready for it if necessary, Benton said.



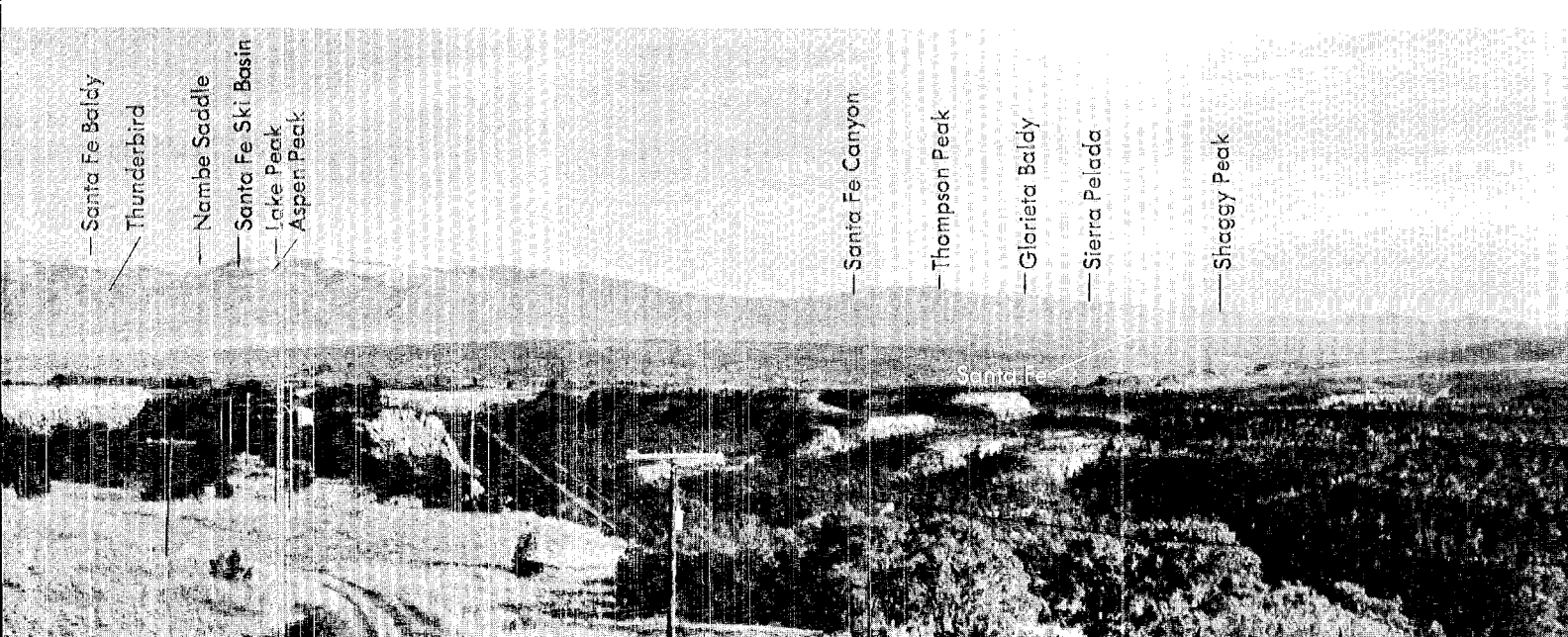
The Jemez . . .

View from the Hill

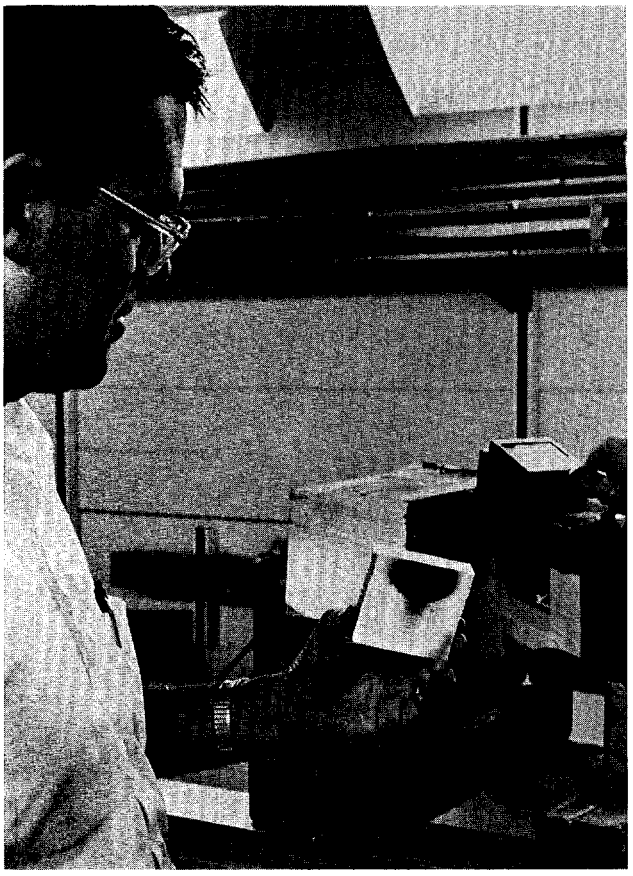
The Sangre de Cristos . . .



The newcomer to Los Alamos is often surprised to find mountains in New Mexico at all—let alone snow-covered peaks ranging to nearly 14,000 feet. But people who live or work amid the spectacular scenery of Los Alamos soon get so accustomed to it they don't even know the names of the landmarks around them, beyond the fact that Los Alamos—aptly called "The Hill"—is perched on the many mesas of the mile-and-a-half-high Pajarito Plateau at the edge of the Jemez Mountains, with the Sangre de Cristo Mountains across the Rio Grande to the east. Los Alamos is one of the few areas in the country where the sunset is as beautiful in the east as in the west; the brilliant rosy glow reflected on snow-capped peaks gives reason for the name, Sangre de Cristo—blood of Christ. Public Relations Photographer Bill Jack Rodgers made the panoramic view of the Sangres from the top of the east gate tower near the airstrip. For the view of the Jemez, he moved down the hill, between the "Y" and White Rock, in order to include Los Alamos in the panorama. The Atom is grateful to AEC Conservation Officer Homer Pickens for labeling the mountains.



Tom Putnam, left, MP-1, and Ed Knapp, MP-3, prepare a stack of microscope glass plates which will be used to estimate the energy of the first electron beam produced by the prototype linac. Plates are placed at target end. After the accelerator beam strikes the plates, depth of penetration shown by radiation blackening allows calculations of energy level to be made.



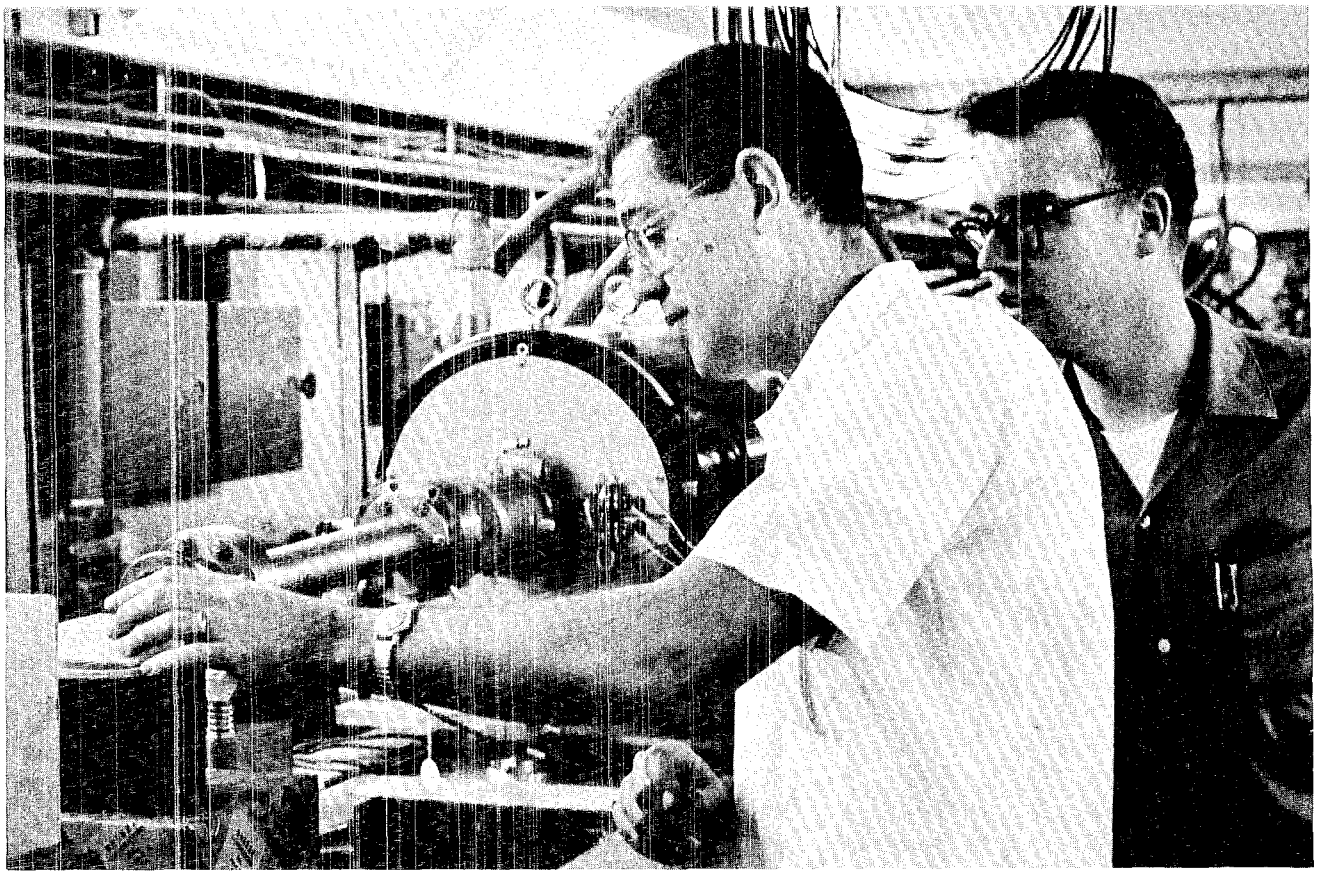
Ed Knapp, MP-3, examines radiation blackened glass plates. Energy level of the first beam produced by the prototype linac was about 25 MeV.

Beam Achieved On MP's Prototype Linac

By Bill Regan

IN THE INVISIBLE WORLD of the particle physicist's interest, hardware is strictly a means to an end and only occasionally is itself of significance.

For a team of scientists, technicians and engineers in the Los Alamos Scientific Laboratory's medium energy physics (MP) division, one of those occasions is now here. Before the planned Los Alamos Meson Physics Facility (LAMPF) becomes a reality, all entries on a long list of preliminary experiments and hardware development tests of the many components necessary for success must be checked off.



Target area arrangement for the first beam was strictly temporary, with a lashup of tape rolls and a cardboard box on which Ed Knapp, MP-3, and Robert A. Jameson, MP-2, place glass plate stack.

Three MP division groups have now logged an important milestone, the completion and operation under full power of a new design linear accelerator (linac).

This electron linac is a prototype to investigate in detail some of the problems associated with the LAMPF proton linac. It uses and tests for the first time under high current a completely new and different cavity design invented at Los Alamos by physicists Edward A. Knapp, MP-3 group leader, and Darragh Nagle, associate MP division leader.

The cavity is the cylinder which confines and serves as a guide for the radiofrequency waves which push the charged particles down an evacuated tube to the target. The particles ride the crest of the radiofrequency wave much like a surfboard rider rides an ocean wave. Particle speed in this case is .999 the speed of light.

The LASL-designed linac also differs from other electron accelerators in mode of operation of the electric field. In this instance, called the 90 degree or $\pi/2$ mode, a 180-degree directional shift by the electric fields occurs in sets of two cavities instead of just one. The first cavity field points right, the second cavity stores no energy, and the next cavity's field points left. This operational mode allows the center cavity of each group of three which contains no energy to be placed outside the beam path astraddle the cavities where there are active fields. The side cavity is connected with the two active cells by slots through which coupling, or the transfer of electrical energy from one cavity to the next, is accomplished. For this reason the LASL design is known as a "side-coupled cavity."

According to Knapp and Nagle, this design requires less electrical power and consequently fewer

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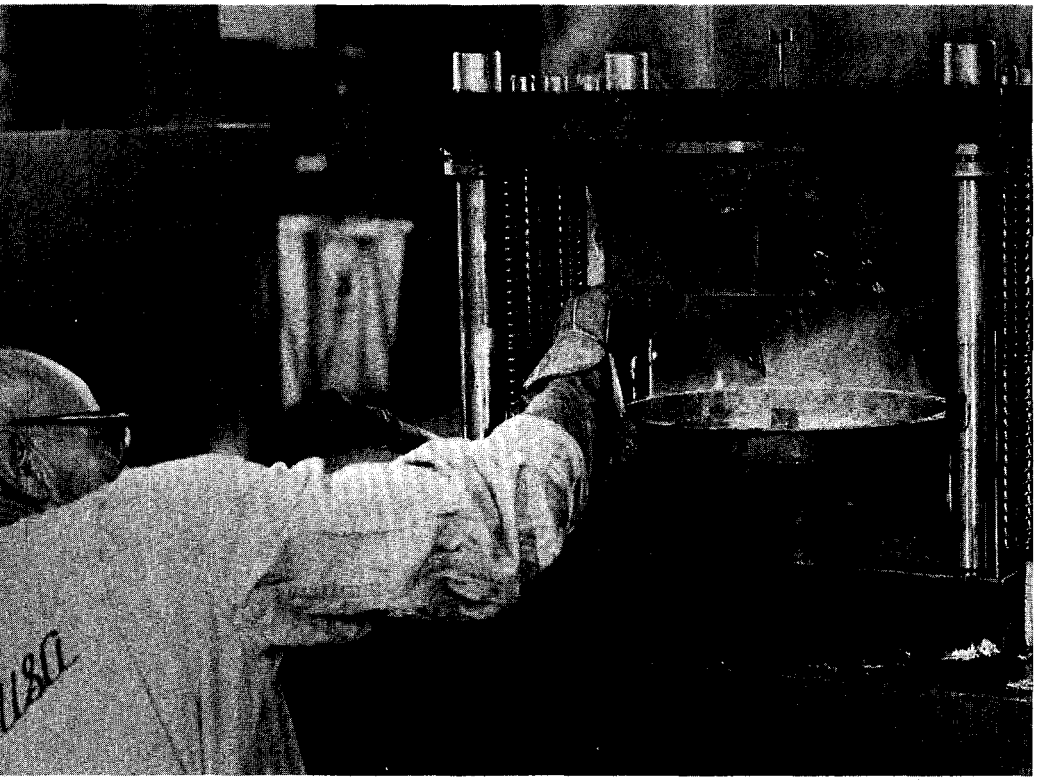
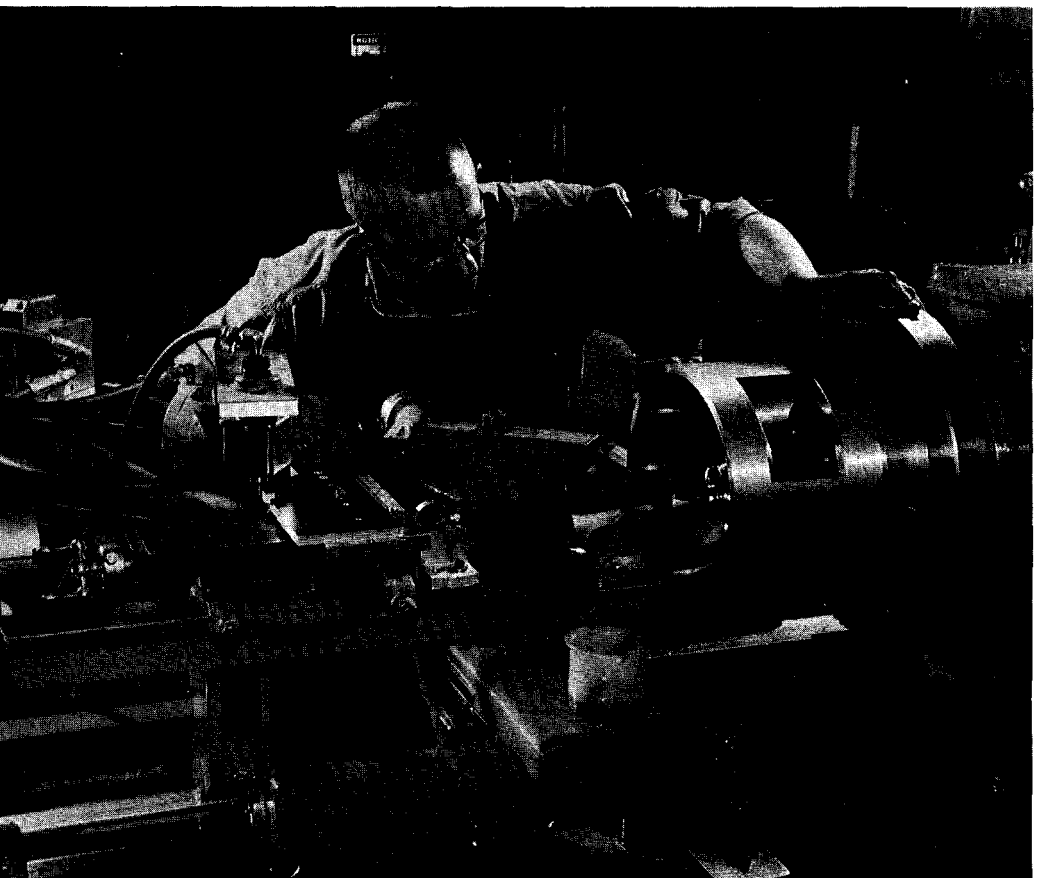


Forging of copper parts for the 100 side-coupled cavities used in the new linac was carried out by CMB-6 fabrication section. Dale Fisher adjusts the setup.

Wendell Smith, SD-5, checks tolerances for final machining of linac cavities.



Linac . . .

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power amplifiers because there is less power loss to walls. The cavity tolerances are less demanding and can be achieved by ordinary shop practice. High electrical stability allows more cavities to be built together in one unit. Little or no individual cavity tuning, a tedious, time-consuming job of putting the waves in proper phase, is necessary. All of these factors add up to lower fabrication costs, easier maintenance, better performance and lower operating costs when the full LAMPF machine is built.

Features of the LAMPF linac which will now be studied are target heat dissipation and radiation damage; radiofrequency phase and amplitude control performance; beam loading effects in the accelerator structure and beam induced phase shift; transverse mode excitation (the prototype electron accel-

Standing and "watching" room was at a premium when Ed Knapp, MP-3, at left, made final adjustments at the target area for the first beam to be produced by a new electron prototype accelerator. Darragh Nagle, co-inventor with Knapp of the side coupled cavity design used in this linac, and Tom Putnam, whose MP-1 group provided instrumentation and control systems, take a close look at the target adjustment operation.

erator is more susceptible to this effect than the proton accelerator); alignment and beam steering tests; accelerator tank production problems, such as tuning procedures and tank conditioning; and automated control system operation.

Evaluation of the possibilities of completely automated computer control of the LAMPF machine has been under way for some time by group MP-1. A small digital computer is being used in the mockup program and will be used to operate the new electron prototype linac. Designers working on the LAMPF machine have made provisions for digital control and monitoring of all systems. Full-scale operation of the prototype will allow intensive study of computer control and hopefully will reveal any "bugs" before the big machine is built.

The prototype, which differs from LAMPF in both size and the type of charged particles accelerated, is comprised of one full scale, 60-foot section of 100 copper cavities joined in four units of 25 each. It accelerates negatively charged electrons to an energy of 20 to 35 million electron volts (MeV). In contrast, the LAMPF machine will have 4400 similar cavities forming a tube 2395 feet long and will boost positively charged protons to an energy of 800 MeV. However, the same design problems can be effectively studied, according to Knapp.

The prototype section was built to accelerate electrons because they are much lighter than protons and require less energy and distance to achieve the same velocity. The electrical behavior of both particles is well understood, and, consequently, data can be readily extrapolated from one to the other.

But the new electron linac is important in its own right. In its class, it achieves the highest average beam current of any linac in the world. It can be used for basic physics experiments. It is the third in a series of experimental linacs to test performance of the LASL originated side-coupled cavity design, but the first to operate using the full beam current and the full power of the amplifier which will be used in the LAMPF accelerator.

Like its big brother proton accelerator, it operates with a high duty factor (the percentage of time which the linac can be operated). Duty factor for LAMPF will be six per cent initially with provision for eventual operation at 12 per cent. The prototype electron ac-

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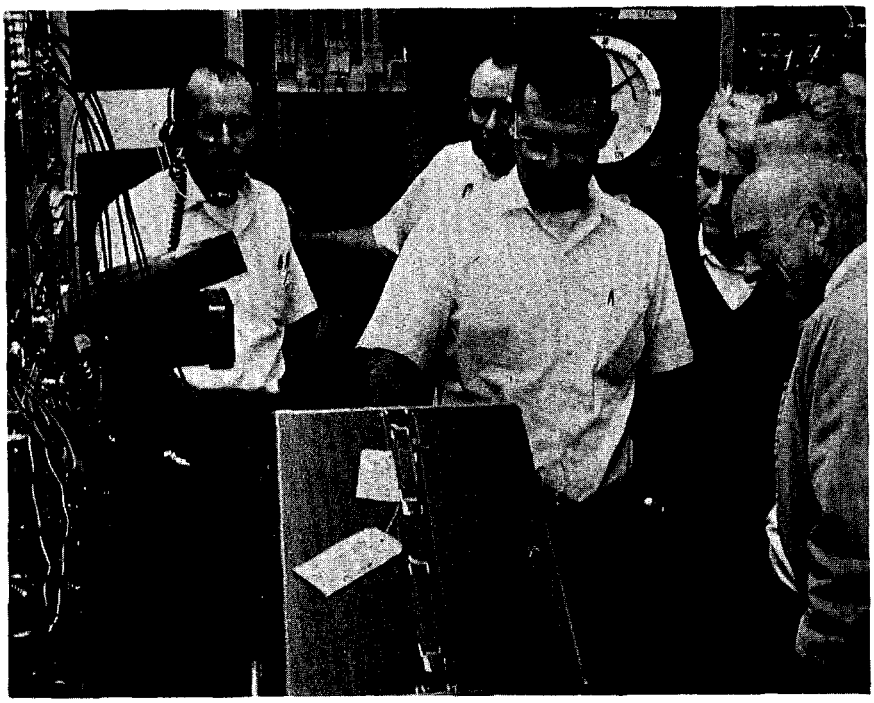
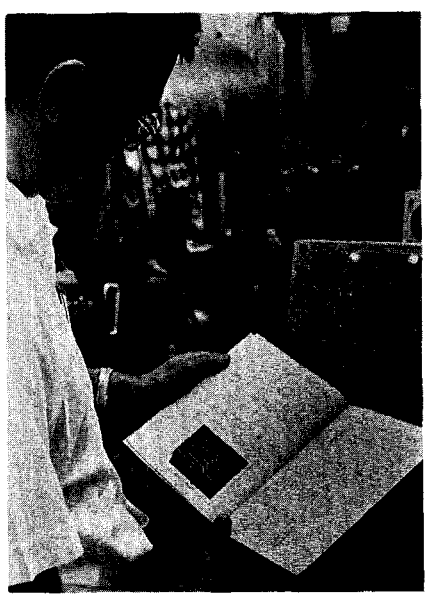


Oscilloscope trace showed that LASL's electron linac was producing a beam for the first time. From left: Don Hagerman and Tom Turner, both MP-2; Ed Knapp and Darragh Nagle, co-inventors of a new accelerator cavity design; Raemer Schreiber, LASL technical associate director and Norris Bradbury, LASL director.



Knapp looks at the photographic record of the oscilloscope trace which indicated production of a beam in the new electron linac.

Linac . . .

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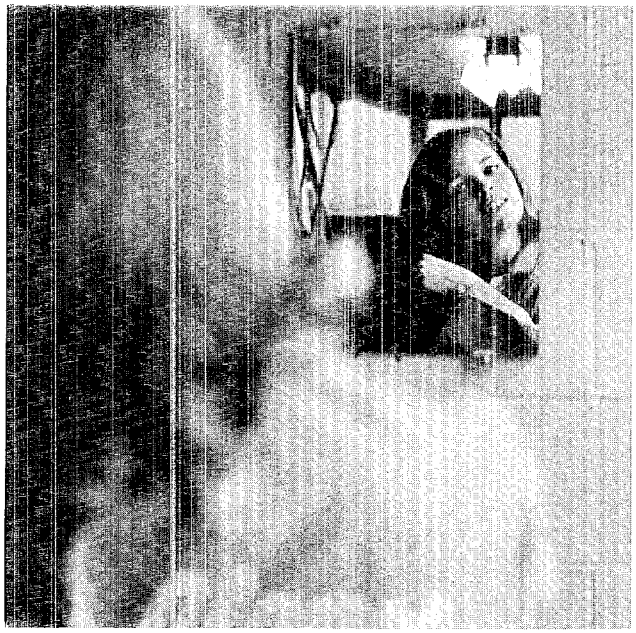
celerator runs at six per cent duty factor.

Much of the large amount of power used in wave guide linear accelerators dissipates in the guide walls causing considerable heating. For this reason, the machines require a water cooling system and are operated in short pulses of one or two millionths of a second duration, with appreciable intervals between pulses. In the LASL designed linac, pulses up to 1000 times longer are possible.

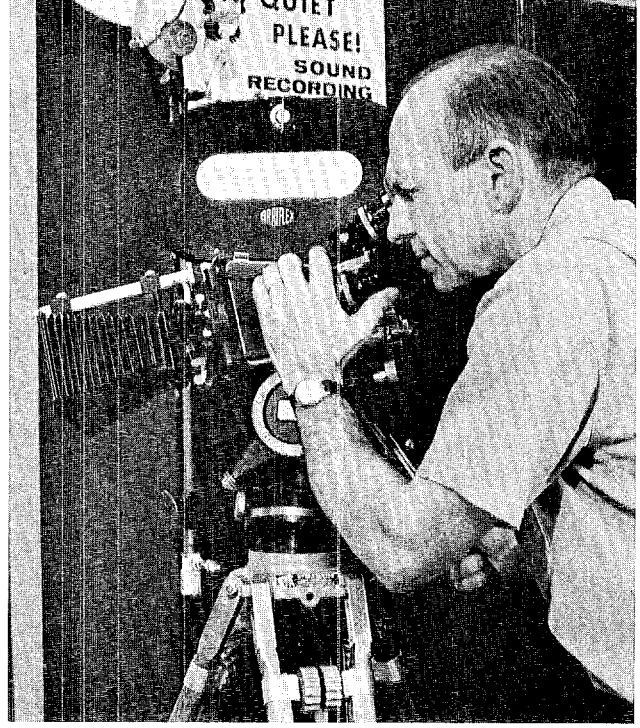
Before the cooling system was completed, the three-group team pulsed the linac and obtained a first beam just before Christmas. Tom Putnam's group MP-1 provided the instrumentation and control system. Radiofrequency power was the responsibility of Don Hagerman's group MP-2, while Knapp's MP-3 group had charge of design and fabrication of the cavity chain and putting together all the components into one operating accelerator.

Important assistance was given by the fabrication section of CMB-6, which forged the copper cavity parts prior to finish machining by the Shops department, and then helped to braze the machined pieces to form the final units. Cavity shape was refined and efficiency optimized by calculations of Harry C. Hoyt, T-5.

Preliminary calculations of penetration depth in the target of glass microscope plates showed that the original design level of 20 MeV had been exceeded. Full current operation could not be tried until the complete water cooling system was installed. This installation is now finished, and full experimental operation of the machine is under way.



"Shooting day" starts with "star" Carole Albrecht, J-DO, doing her own makeup. Makeup area is a mirror on the wall; the dressing room, an unused darkroom.



Roy Stone, D-8 motion picture cameraman, checks his camera view for a "take". The cameraman is the most consistently busy person on the set.

Movie Making, LASL Style

PHOTO STORY BY
BILL JACK RODGERS

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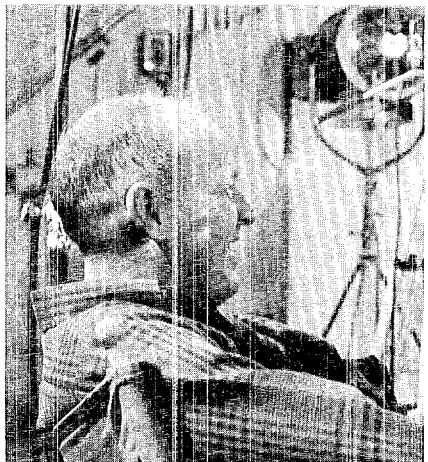
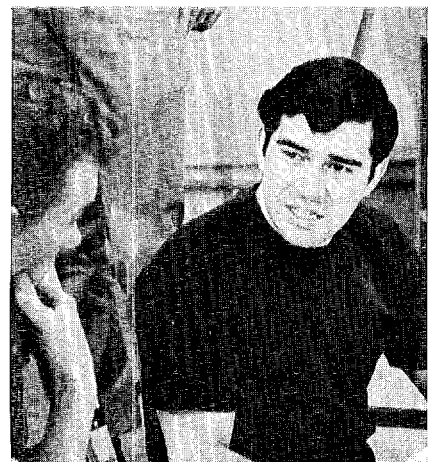
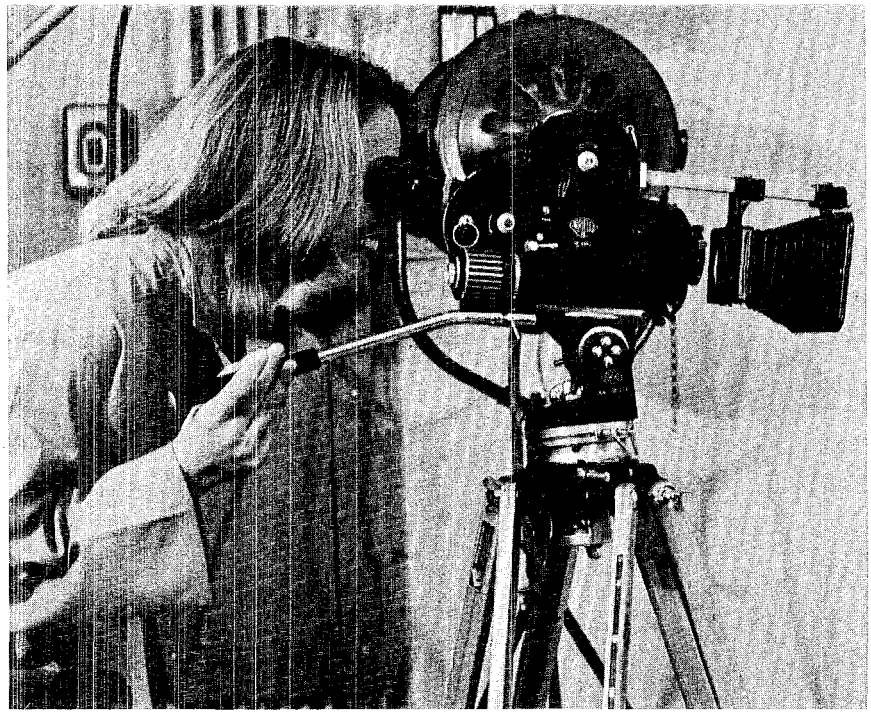
ABOVE: Hal Olsen, D-3, plays lead role as a motion picture director. BELOW: Bill Claybrook, D-8 cameraman, became an actor portraying the part of motion picture cameraman.



Max Spring and Bob Inglis, D-8 photographers, await their turn in front of the cameras. Both had parts in a scene.

Writer-director Mario Balibrera, D-10, discusses the next scene with Bob Inglis. A comedy reaction is serious business.





LEFT: Carole's wardrobe, consisting of one lab coat, was a little loose. Since the script called for front views only, clips on the back remedied the costume malfunction. ABOVE: View from behind camera was an amusing break for Carole during the day's shooting. BELOW: Cameraman Roy Stone makes a final light reading of Carole and Hal before a "take".

Documentary Films . . .

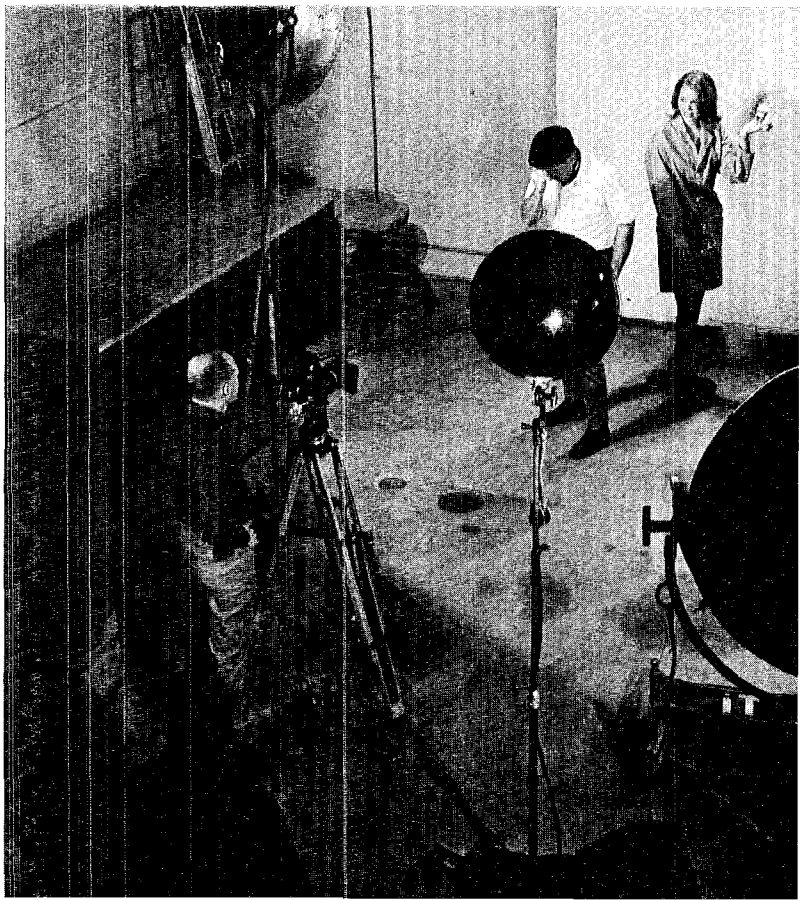
continued from preceding page

Carole Albrecht, full-time secretary for J-DO, is now a part-time actress. This limited opportunity was recently available to Carole in the form of a LASL motion picture script. A product of D-10, documentary films, the script called for numerous actors and actresses to assist in an upcoming film. Parts ranged from a reasonable delicate walk-on (no such thing as a small part) to the more complex art of pantomime. Strictly a job for the professionals.

But "professionals" is an expensive word to the in-plant film maker. A candid definition of the

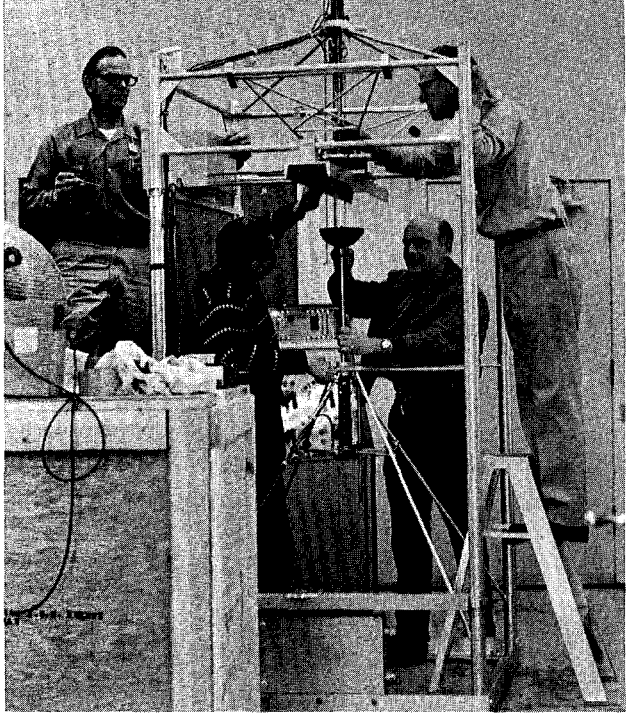
Balibrera demonstrates action to take place in next scene. This movie will be available to other LASL groups to show the services D-10 performs in making documentary movies and film reports of LASL projects. Other recent D-10 efforts include a film report on a recent LASL eclipse study (available nationally to schools and similar audiences), a movie on security and reports on many LASL activities, such as Project Rover and underground testing.

Carole and Hal rehearse before shooting begins. Director and cameraman time the scene.



in-plant motion picture could be: a motion picture made with a minimum of cost to the plant—in this case, the Laboratory. Therefore, the usual solution would be used: the acting chores would be accomplished in a most professional way, by amateurs—LASL employes.

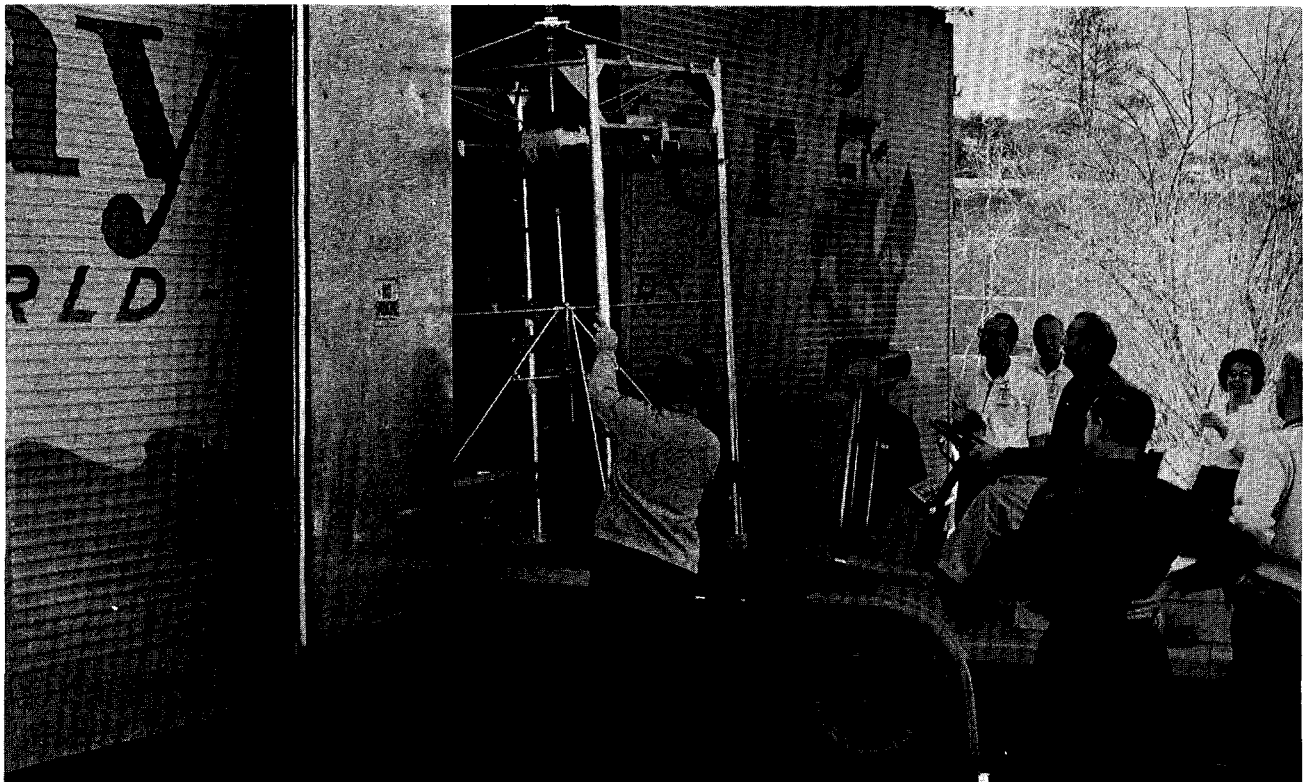
The photographs were made during one day's shooting and depict some of the trials and tribulations of movie making, LASL style. Study the photographs closely. The next script may have a part written "just for you." And remember, smile you're on . . . well, you know the rest.



Godiva I, LASL's first unclad fast-burst reactor, is prepared for shipment to the Smithsonian Institution by Bob Wagner, Jim Grundl, Tom Wimett and Roger White, all N-2. White will reassemble Godiva at the Smithsonian.

Godiva Takes A Ride

ABOVE: Wimett, Grundl, Wagner and White wheel Godiva out of Pajarito Site storage area. BELOW: Most N-2 personnel were on hand for the lady's send-off.



The Technical Side

Presentation at the Rocky Mountain Section of the American Industrial Hygiene Association, Albuquerque, Sept. 29-30:

"Safe Handling of ^{239}Pu and Control of Alpha Contamination at a LASL Laboratory" by T. H. Garcia, H-1.

Presentation at Colloquium, University of Michigan, Ann Arbor, Mich., Nov. 17:

"Some Aspects of Nuclear Missile Vulnerability" by H. A. Sandmeier, T-DOT.

25th Meeting of High Temperature Fuels Committee, San Diego, Calif., Dec. 5-7:

"Summary of Recent Work on Ceramic Plutonium Fuel Materials" by J. A. Leary, CMB-11.

American Physical Society Meeting, Pasadena, Calif., Dec. 20:

"Potential Measurements in Dissipative Superfluid Flow" by E. F. Hammel, Jr., CMF-9.

134th Meeting of the American Association for the Advancement of Science, New York, N.Y., Dec. 26-31:

"Technological Developments from Fusion and Plasma Research" by John Marshall, P-17.

Meeting of the American Statistical Association, Washington, D.C., Dec. 27-30:

"Double Sampling Plans Where the Acceptance Criterion is the Variance" by R. K. Zeigler and G. L. Tietjen, both T-13.

Physics Symposium, University of Texas, El Paso, Texas, Jan. 4:

"Degenerate p-n Junctions" by C. L. Wilson, T-7.

Colloquium at the University of New Mexico, Albuquerque, N.M., Jan. 5:

"Mossbauer Effect Studies of a Localized Magnetic Moment Problem" by Martin Maley, CMF-9.

Health Physics Society Midyear Topical Symposium on "Environmental Surveillance in Vicinity of Nuclear Facilities," Augusta, Ga., Jan. 24-25:

"The Variability in the Parameters Used to Predict the Dose to the Thyroid from the Ingestion of ^{131}I in Milk" by W. E. Stocum, H-8.

"The Statistical Nature of the Radioactive Effluent from Ground Tests of Nuclear Rocket Engine Prototyes" by R. V. Fultyn, H-8.

"A Probabilistic Scheme for Predicting and Evaluating Hazards Resulting from Radioactive Emissions to the Atmosphere" by R. F. Fultyn, H-8.

Presentation at local chapters of the Health Physics Society as follows: Central Rocky Mountain Chapter, Denver, Colo., Jan. 11; Columbia Chapter, Richland, Wash., Jan. 15; Deep South Chapter, Hattiesburg, Miss., Jan. 20; Florida Chapter, Winter Haven, Fla., Jan. 26:

"Health Physics Aspects of the Nuclear Weapons Incident in Spain" by W. H. Langham, H-4.

American Mathematical Society Meeting, San Francisco, Calif., Jan. 23-27:

"$O(h^{2n+2-m})$ Bounds on Some Spline Interpolation Errors" by B. K. Swartz, T-1.

Mossbauer Symposium, Chicago, Ill., Jan. 27-28:

"Temperature Control" by W. A. Steyert and M. D. Daybell, both of CMF-9.

American Physical Society Meeting, Chicago, Ill., Jan. 29-Feb. 1:

"Positions of Vibrational Transition States from Analysis of (d, Pf) and (t, pf) Measurements" by H. C. Britt and F. A. Rickey, Jr., both P-DOR.

"Determination of the Pairing Gap in the Transition State Spectrum from ^{239}Pu(d, pf) and^{234}U(t, pf) Angular Correlation Measurements" by F. A. Rickey, Jr., and H. C. Britt, both P-DOR.

"Polarized Deuteron Beam from (α, d) Elastic Scattering" by V. S. Starkovich, P-12; G. G. Ohlsen, P-DOR; E. M. Bernstein, University of Texas, Austin, Texas; and W. G. Simon, University of Wyoming, Laramie, Wyo.

"Proton Hole States Excited in the Reaction ^{208}Pb(t, α) ^{207}Tl" by P. D. Barnes, P-DOR, D. D. Armstrong, P-12, E. R. Flynn, P-10, and G. J. Igo, P-DOR.

The ^{208}Pb (t, d) ^{209}Pb Reaction at 20 MeV" by G. J. Igo, P-DOR, E. R. Flynn, P-10, P. D. Barnes, P-DOR, and D. D. Armstrong, P-12.

"Optical Model Potential for Tritons" by L. R. Veeser, P-DOR, D. D. Armstrong, P-12, and P. W. Keaton, P-DOR.

"^{91}Y Levels Observed in the ^{89}Y (t, p) Reaction" by D. C. Williams, The Sandia Corporation, Albuquerque; O. E. Johnson, Purdue University, Lafayette, Ind.; J. D. Knight, J-11; and W. T. Leland, P-10.

"Proton Rigid Lattice Second Moments of Several Ice Polymorphs' by E. D. Finch and S. W. Rabideau, both CMF-2.

short subjects

Dates for this year's Science Youth Days at LASL have been set for April 4 and 5. High school science seniors from the five-state area of New Mexico, Texas, Colorado, Arizona and California will visit certain unclassified Laboratory sites during the 12th annual event. Last year a total of 805 students from 50 high schools participated, and an equal number is expected this year, according to **Pat Smith,** PUB-2, coordinator of the event.

The visitor count at LASL Science Hall and Museum ran up to 60,754 in 1967, an increase of 8,315 over 1966.

Museum Manager **Bob Brashear** said visitors signed in from all 50 United States and Washington, D.C., and 72 foreign countries.

A revised set of priority regulations for the sale of apartment houses in Los Alamos is expected to be presented to the public for review and comment early in February, according to Herman Roser, AEC Area Manager. The new regulations were necessitated by legislation passed late last year which revised the method for selling apartments. A county-appointed citizens committee has been meeting with officials of AEC and the Department of Housing and Urban Development to work out the new regulations which will have to be approved and added to the Code of Federal Regulations by publication in the Federal Registry before the sale can proceed. Roser said it would be late in the year before the first offering could be made.

Fred L. Ribe, P-15 group leader, has been appointed to the board of Editors of *The Physics of Fluids.* The three-year term, beginning Jan. 1 this year, was announced by H. William Koch, director of the American Institute of Physics.

Ribe, with LASL since June, 1951, received his B.S. degree from the University of Texas and his Ph.D. degree in physics from the University of Chicago.

The observance of the 25th anniversary of the Los Alamos Scientific Laboratory and groundbreaking ceremonies for the Los Alamos Meson Physics Facility have been set for Feb. 15. Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, and U.S. Senator Clinton P. Anderson are among those who will participate.

The Meson Facility is a 55-million-dollar proton linear accelerator of energy more than 10 times higher than the highest-energy machine of this type now in operation. The accelerator will be one-half mile long and will be constructed on the Mesita de Los Alamos, east of the main technical area. It will be used to explore the nucleus of the atom and will be utilized by scientists from throughout the United States. It is expected to be operational by the end of calendar year 1971.

The original contract for a scientific installation at Los Alamos was dated January, 1943. This first contract was between the University of California and the Manhattan Engineer District, the World War II forerunner of the AEC. The University of California's contract has continued ever since—making it one of the nation's "oldest" nuclear contractors.

Harold M. Agnew, head of the Weapons Division of the Los Alamos Scientific Laboratory, has been reappointed chairman of the U.S. Army Scientific Advisory Panel. The reappointment for a second two-year term was recently announced by Secretary of the Army Stanley R. Resor.

The Army Scientific Advisory Panel, composed of scientists, educators and industrial leaders, advises the Secretary of the Army and his staff on scientific and technological problems.

A new LASL group, W-9, was formed last month, it was announced by W Division Leader Harold M. Agnew. **LeRoy Horpedahl,** a staff member in W-1 for the past 16½ years, is group leader. Primary responsibility of W-9 will be liaison with the Department of Defense, including preparation of Laboratory advanced weapon proposals.

Agnew said that since W-9 will be a small group, they will, of necessity, call for calculations, design studies and assistance from other groups and individuals in the Laboratory.

new hires

Accounting Department

Evelyn June Barnes, Los Alamos, AO-DO

CMB Division

William K. Gibson, Tucumcari, N.M., CMB-6

Gerald A. De Volk, Corrales, N.M., CMB-6

CMF Division

Allene L. Lindstrom, Los Alamos, CMF-5

Engineering Department

Jesse P. Saulsbury, Houston, Texas, ENG-2

Doyle A. Davis, Milwaukee, Wisc., Eng-3.

Le Roy R. Miera, Los Alamos, ENG-3

Lloyd E. Smith, Jr., Houston, Texas, ENG-4

Maurice W. Collins, Pittsburgh, Pa., ENG-6

GMX Division

Phyllis L. Sullivan, Los Alamos, GMX-6

H Division

Wilbur L. Workman, Fargo, N.D., H-1

Patricio E. Trujillo, Jr., Santa Fe, H-6

Dorothy M. Henderson, Los Alamos, H-7

Paul W. Lashbrooke, Des Plaines, Ill., H-7

J Division

Paul N. Iwanchuk, Columbus, Ohio, J-15

Charles P. Robinson, Tallahassee, Fla., J-17

MP Division

Peter A. M. Gram, El Segundo, Calif., MP-AE

Joe G. Katcher, Los Alamos, MP-2

N Division

Melvin M. Stephens, North Haven, Conn,. N-6

P Division

Teodosio R. Montoya, Santa Fe, P-2

Michael R. McClannahan, Albuquerque, P-16

Personnel Department

Mary L. Calvert, Los Alamos, PER-1

Mary J. Singleton, Espanola, PER-1

Public Relations

Kent H. Bulloch, Los Alamos, PUB-2

Shops Department

Raymond L. Garcia, Espanola, SD-DO

Johnny E. Archuleta, Los Angeles, Calif. SD-DO

Jose P. Herrera, Santa Fe, SD-DO

Joe E. Gonzales, Los Angeles, Calif., SD-1

Robert F.D. Griffiths, Sunnydale, Calif., SD-2

Supply and Property

Bennie J. Chavez, Los Alamos, SP-3

Shirley W. Davis, Los Alamos, SP-12

Donnabeth Stein, Los Alamos, SP-12

T Division

David C. Buckner, Phoenix, Ariz., T-1

Cartherine L. Bay, Los Alamos, T-1

Charlene Douglass, Albuquerque, T-1

Patricia R. Snider, Santa Fe, T-1

Evelyn L. Heck, Washington, D.C., T-1

Richard J. Young, Oakland, Calif., T-2

Richard W. Sharp, Jr., Toledo, Ohio, T-2

June H. Gage, Los Alamos, T-9

Mario E. Schillaci, Waltham, Mass., T-9 (Postdoctoral)

W Division

Mary J. Gammel, Los Alamos, W-4

Helen J. Fuller, Los Alamos, W-8

Three Laboratory Men Die

HORACE COLYER, senior lead operator in GMX-3 died Dec. 28 of a heart attack. Born May 19, 1916, in Bloomberg, Texas, Colyer joined LASL March 1, 1946. He is survived by his widow, Eva E. Colyer, also an employe of GMX-3; three daughters, Mrs. Thomas Lawrence of White Rock; Mrs. David Peterson, Troy, N.Y.; and Miss Margaret Colyer, Artesia, N.M.; three brothers, three sisters and two grandchildren.

O. C. CREED, 55, who retired from the Laboratory Jan. 10, 1967, died Jan. 8 in an Albuquerque hospital. Creed had been employed by group GMX-3 since May, 1953. He first came to Los Alamos with the Army in 1945. He was born Dec. 8, 1912, in De Ridder, La. Creed is survived by his widow, Rae R. Creed, a GMX-3 employe; one daughter, Mrs. Jo Ann Klutts, of Groves, Texas; three brothers, one sister and four grandchildren.

JACK L. KERNS, machinist in the Shops Department, died Jan. 13 at the Los Alamos Medical Center following a heart attack.

Kerns was born Jan. 14, 1925, in Hannibal, Mo., and was a veteran of the U.S. Army. He joined LASL in October, 1960. Survivors include his widow, Florence; four daughters, Mrs. Jean L. Baca, Mrs. Judith A. Harrison, Mrs. Deborah J. Gettemy and Sharon Kerns; one son, Jack, Jr.; his mother, Mrs. Alma R. Kerns of Albuquerque; three brothers, three sisters and five grandchildren.

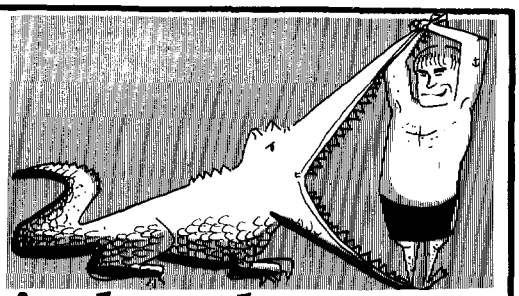
Two Retire During January

Two employes retired from the Los Alamos Scientific Laboratory during January.

AMADASE M. ALLEX, GMX-3 lead operator, plastics, retired Jan. 5 after nearly 13 years with LASL. Hired in May, 1955, as a chemical plant operator, Allex was with group GMX-3 his entire time at LASL. He is originally from Watford City, N. Dak., and spent 20 years in the U.S. Navy, retiring in 1954 as chief torpedoman. His late wife, Ruthanita, also worked in GMX-3 for seven years until her termination in 1962. He has two daughters, Darlene and Elsie, and two sons, Hart and Martin. Allex said he plans to move to Monterey, Calif., in the near future to make his home.

THEODORE HOLZWARTH, laboratory services inspector, retired Jan. 16. Holzwarth joined LASL in May, 1959, and has worked in CMB-AS continually. Prior to coming to Los Alamos, he worked in Evansville, Ind., where he grew up. Plans for the future for Holzwarth include returning to Evansville to live after retirement, and possibly working there.

20 years ago in los alamos



Culled from the Files of Los Alamos Times, February, 1948, by Robert Y. Porton

General Groves Retires

Lt. Gen. Leslie R. Groves, wartime boss of the army's atom bomb project, will retire this month. The army made the announcement, but said it had no information on Groves' future plans. Groves was head of the Manhattan project, and after atomic energy development was turned over to a civilian commission, he was named chief of the armed forces special weapons project.

Snow Blankets City

Old Man Winter dumped more than a foot of snow on the atom city this week with weather prognosticators giving little hope for immediate relief. In a 12-hour period Wednesday, 12½ inches of snow fell, bringing the total so far this season to 49.8 inches.

Arthur B. Allen, assistant chief, Zia Maintenance Division, estimated that 200,000 cubic yards of snow were moved in clearing roads.

Council Names Charter Commission

The town council has named 15 persons who have been entrusted with the most important task assigned to any civic group since the inception of the project—the election of a form of government for Los Alamos. Among those appointed are O. Russell Jones, Donald P. MacMillan, Mrs. Raemer E. Schreiber and Gerold H. Tenney.

The government plan chosen by the group will be submitted to voters on a referendum on a date to be determined by the council.

After weeks of discussion by the council and residents, the town fathers decided to appoint the charter commission.

'Gator Jousts with Man at Hall Tonight

Something besides the weather will send a few chills down the spines of sport fans who are on hand in community hall tonight. It will be an alligator wrestling with a man. The 'gator, whose exact measurements were not available at press time, but whose pictures show him to be about six feet from snout to tail, will vie with one Tuffy Truesdale. The match is to be staged during an interval between regular man-to-man wrestling bouts slated here this evening.

Truesdale prefaces his match with the animal with a lecture on the lives and loves of alligators.

Fireguards at the hall have promised not to stand in exits during the contest—in case the snapper decides to abandon his struggle with Tuffy for easier meat.

what's doing

TRAVEL SLIDE PROGRAM: Mesa Public Library, 7:30 p.m.
- Thursday, Feb. 8—"Portugal and Southern Spain," by Gordon Hoffman.
- Thursday, Feb. 29—"Mexico," by Ed Wilder.

LOS ALAMOS LITTLE THEATER: "The Odd Couple," by Neil Simon, Friday and Saturday, Feb. 2 and 3, 8:15 p.m., Civic Auditorium. Season tickets at $6 and single admission at $2 available at the box office of the auditorium. Season tickets also available from Kay Anderson at 2-3510, or Betty Lilienthal at 2-4927. For reservations on season tickets, call Doris Schoenfeld, 672-3464.

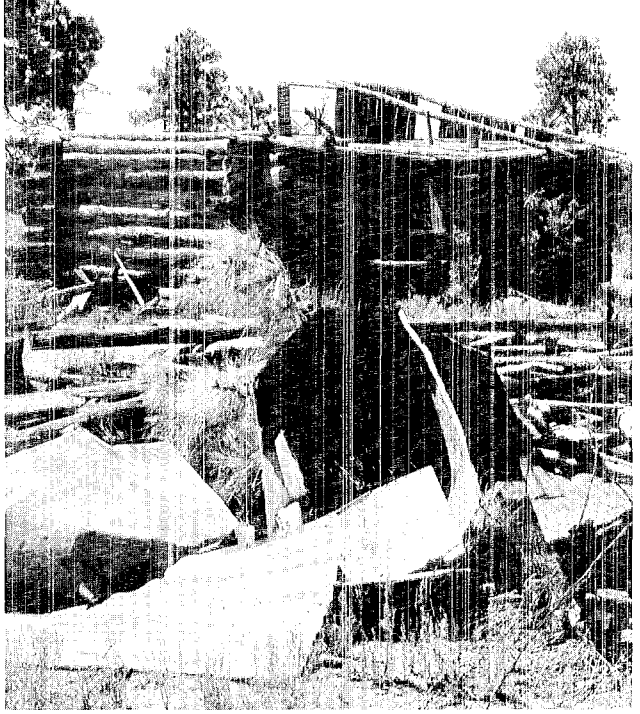
OPERA BALL: Saturday, Feb. 24, Knights of Columbus Hall, 9 p.m. until 2 a.m. Ed MacMann's 11-piece orchestra. Formal dress encouraged but not required. Admittance by reservation only; $15 per couple. For reservations, call Ruth Demuth, 2-4107, or Joan Cochran, 672-3867. Proceeds to benefit Santa Fe Opera rebuilding fund.

LOS ALAMOS CONCERT ASSOCIATION:
- Sunday, Feb. 18—Orchestra San Pietro of Naples, 3 p.m., Civic Auditorium.

LOS ALAMOS SINFONIETTA: Chamber Concert, Sunday, March 10, 4 p.m., The Lodge. Don Beene conducting. Included will be the Kinder Symphony by Haydn; "The Hollow Men," by Persichetti (trumpet solo with string accompaniment); a brass ensemble and string quartet. Admission by season ticket or at the door. $1.50, adults; 75 cents, children.

OUTDOOR ASSOCIATION: No charge; open to the public. Contact leader for information about specific hikes.
- Sunday, Feb. 11, Guaje Canyon from Ski Area. Ken Ewing, leader, 8-4488.
- Sunday, Feb. 18, San Antonio Mountain. Ed Kmetko, leader, 2-3173.
- Saturday, March 2, Peralta Canyon Ridge. Virginia Winsor, leader, 2-3440.

LOS ALAMOS SKATING ASSOCIATION: Schedule for use of ice rink, Los Alamos Canyon:
- Mondays: After-school session, 3 to 5 p.m. (small children encouraged to attend.) General skating, 7 to 9:30 p.m. (Family night—special family rate $1.25). Free skating lessons.
- Tuesdays: "Mothers and Tots" session, 9:30 to 11:30 a.m., After-school session, 3 to 5; adults only, 7:30 to 10.
- Wednesdays: After-school session, 3 to 5 p.m.; general skating, 7 to 9:30 p.m.; hockey team, 9:30 to 10:30 p.m.
- Thursdays: "Mothers and Tots" session, 9:30 to 11:30 a.m.; After-school session, 3 to 5 p.m.; Figure Skating Club patch session, 6 to 7:30 p.m.; adults only, 7:30 to 10 p.m.
- Fridays: After-school session 3 to 5 p.m.; "Game Night," 7 to 9:30 p.m.
- Saturdays: Hockey during morning; general skating, 2 to 4:30 p.m.; "Date Night" (high school, young adults), 7 to 10 p.m.
- Sundays: Professional lessons in morning; general skating, 2 to 4:30; Figure Skating Club, 6 to 7:30; adults only, 7:30 to 10.



The old log cabin on Pajarito Road—less than 60 years old, but probably the oldest building in Los Alamos county—has been restored to like-new condition by Los Alamos Boy Scout Troop 229. The boys, several fathers and Scout leader Fred Ferrell, N-7, spent more than 1500 man hours restoring the back wall, rafters and ceiling beams and replacing the roof. Several logs for the back wall were cut, hauled to the site and peeled to match the existing logs. Since the original roof was too rusty to use, tin was removed from the Archuleta barn near Pine Springs to provide the new roof. AEC Conservation Officer Homer Pickens supervised the operation and will obtain a historical marker for the cabin. The Boy Scouts also collected pots, pans, bottles and farm machinery from the area and will eventually place them in and around the cabin. The cabin has a colorful history and was threatened with destruction several times—most recently when water and hydrogen lines were slated to go directly through the site on which it is located. But a sense of history prevailed, and the two lines swerve to miss the cabin. The land was homesteaded in 1896 by David Romero. Bences Gonzales, who retired from LASL's P-1 in 1958, married Romero's daughter and helped to build the cabin about 1910. The land was still in the Romero family when the Manhattan Engineer District took possession of it on Sept. 13, 1943.

BACK COVER:

After this winter's record snowfall in Los Alamos and hard-working maintenance crews had managed to restore some semblance of normalcy to streets and parking lots, there was at least one indication that the snow won't last forever. The sign *belongs* where it is—near the Administration building flag pole; we're not too sure about the snowbank! For a prettier view of the snowfall, see pages 6 and 7.

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